

modern machine shop

PROGRESSIVE
DIES

See Page 114

NATIONAL
DEFENSE

See Page 128

AUTOMATED
MACHINING

See Page 138

AUG. 1955

*Another job done better
on a **Verson** press!*

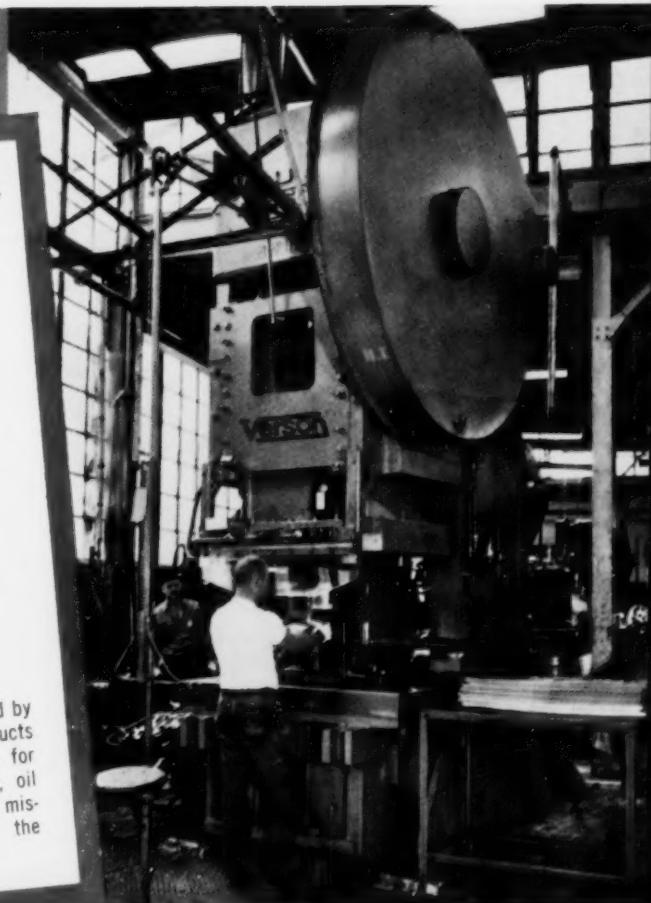
**NOW O.B.I.
FORMING
GOES BIG
IN THIS**

Verson

PRESS

• 250 ton Verson O.B.I. used by Industrial Wire Cloth Products Company, Wayne, Michigan, for forming valve head covers, oil filters (shown here) and miscellaneous stampings for the custom automobile trade.

VERSON ALLSTEEL PRESS CO.
CHICAGO AND DALLAS



HOW WE QUADRUPLLED TOOL LIFE—and cut tool cost 75%

—as told by George Edgar,
Foreman, D. O. James Gear
Mfg. Co., Chicago, Ill.

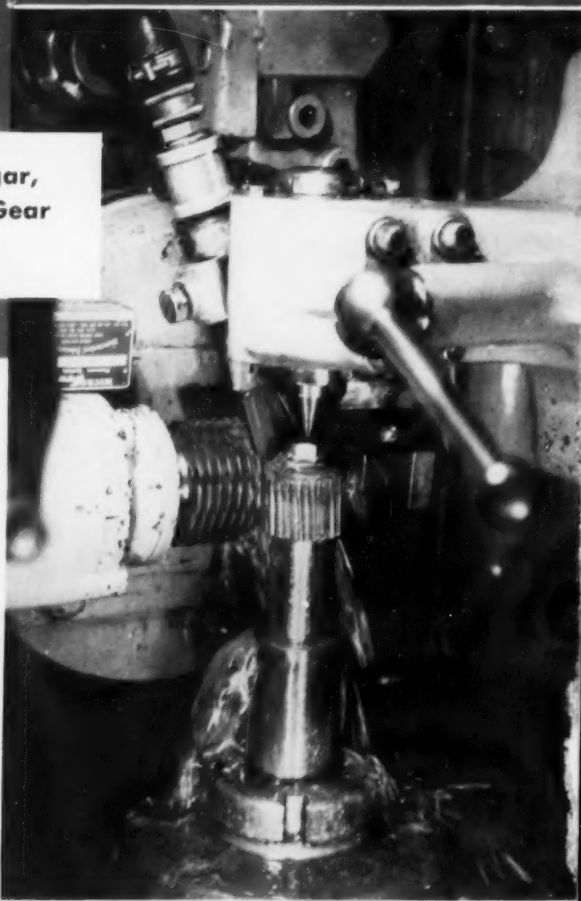
"THE JOB was hobbing a small helical gear," says Mr. Edgar. "With the cutting oil we have been using we averaged about 125 gears between resharpenings after using the full face of the hob."

"A Texaco Lubrication Engineer offered to help us do better. On his recommendation, we changed to *Texaco Transultex Cutting Oil B* and found we could run 500 gears before hobs had to be sharpened. This gave us four times the tool life and cut our tool costs on this job by 75 per cent."

Everywhere, *Texaco Cutting, Grinding and Soluble Oils* are helping to machine faster, better and at lower cost—regardless of the metal being cut or the method of machining it.

Let a Texaco Lubrication Engineer help you gain these benefits for your plant. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



JOB DATA

Steel	AISI 4140	No. of teeth	19
Hardness	Rc 30-35	Diam. Pitch	12.037
Diameter	1.75"	Hob Diam.	3.50
Face	0.75"	RPM	110
Shape	Helical	Feed	0.070"

SFPM 101



TEXACO

CUTTING, GRINDING,
SOLUBLE AND
HYDRAULIC OILS

M. L. FORNEY, *Publisher*
RICHARD S. KLINE, *General Manager*
FRED W. VOGEL, *Editor*
HOWARD CAMPBELL, *Editor Emeritus*
ROBERT I. SHORE, *Managing Editor*
R. L. GRIESINGER, *New Equipment Editor*
GILBERT C. CLOSE, *Contributing Editor*

modern machine shop

FEATURES IN THIS ISSUE

- 106** Machining Operations on Parts for Jeffrey Products • *By Fred W. Vogel*
- 114** High Production With Progressive Dies • *By Gilbert C. Close*
- 120** New Automatic Produces Parts Faster • *By H. S. Sizer*
- 124** Transmission Extensions Machined on Transfer Plate-Type Fixtures
- 127** Machining One-Piece Aircraft Wing Panels
- 128** Modernization and National Defense • *By Ralph S. Howe*
- 138** Tape-Automated Machining
- 150** Flame-Plating Sewing Machine Feed Dogs
- 154** Worn Valves Reclaimed by Metallizing

DEPARTMENTS:

- 48** Important Meeting Dates
- 53** Advertising Representatives
- 158** New Literature
- 164** New Shop Equipment
- 272** "Where to Get It"
- 282** Editorial
- 284** Index to Advertisements

Member



Published monthly and copyrighted (1955) by Gardner Publications, Inc., 431 Main St., Cincinnati 2, O.
Printed in U.S.A. Accepted as controlled circulation publication at Cincinnati, Ohio.

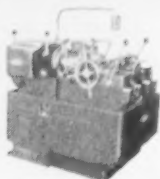
(For more information on cover advertisements, use Reader Service Cards)

THE
MACHINE TOOL
SHOW
BOOTH
1406

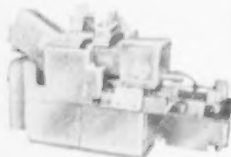


CUTTING GRINDING TAPPING ROLLING

THREADS



CUTTING



GRINDING



TAPPING



ROLLING



• The 8C LANDMACO—one of five new Thread Cutting machines to be demonstrated. These machines are designed for precision threading of workpieces from 3 1/16" to 6 5/8" in diameter. Above is the new 2" LANDMATIC—one of the many Standard and Special Thread-Cutting Heads on display designed for application to Automatics and Turret Lathes.

• The CENTERLESS Thread Grinder—to be shown in operation—for infeed and thrufeed grinding of threads from 1 1/16" to 4" in diameter at mass production rates.

• The LL Collapsible Tap for producing internal tapered threads featuring detachable heads for wide range coverage. On display will be Rotary or Stationary Standard Taps for straight or tapered threads, Solid Adjustable Taps, Valve Taps, and Taps for other special applications.

• The new LANHYROL Thread Rolling Machine—shown in a variety of demonstrations—revolutionary in its output, accuracy, and flexibility. Above is the #20 LANROLL Attachment—one of five sizes of Thread Rolling Attachments for Automatics and Turret Lathes to be displayed.

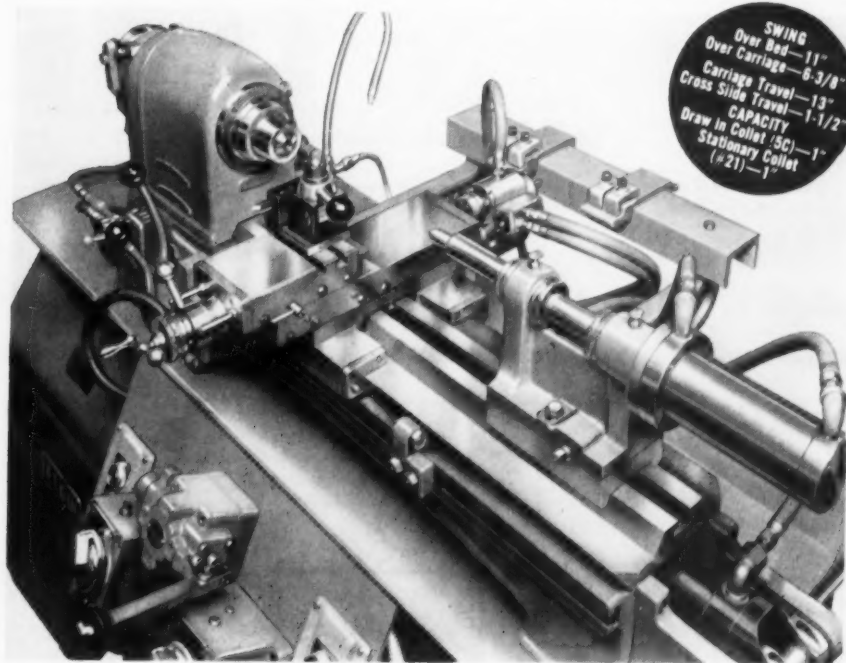
LANDIS Machine COMPANY • WAYNESBORO
PENNSYLVANIA

For more data circle 201 on Reader Service Card

ELGIN PRECISION

for more than 50 years

Announces its **NEW** PRECISION HYDRAULIC TRACER LATHE



Elgin Tool Works announces the development of its New Hydraulic Tracer Lathe, a precision machine for close duplication of smaller parts in large or small lots.

This machine is hydraulic in its primary duplicating functions and includes air operated features to facilitate part loading, unloading and clutch brake drive operation.

See our Booth No. 320 at the Chicago Coliseum

ELGIN TOOL WORKS, Inc.

1771 BERTEAU AVENUE

-:-

CHICAGO 13, ILLINOIS

For more data circle 202 on Reader Service Card

August, 1955

modern machine shop 3

It's New!

A NO IMPACT HOLDDOWN SYSTEM FOR SHEARS

The Lodge & Shipley "No Impact" holddown system means *no mars, no dents, no holddown clatter* . . . and you still get positive holding power for accurate cutting, unsurpassed by any shear!

With the new Lodge & Shipley holddown system eliminating impact *and* damage, you can now shear the softest, most highly polished metals without impact mar. This "soft touch with terrific holding power" is a Lodge & Shipley exclusive!

Also available, for standard shearing, is the proven Hydro-Hold holddown system which offers positive, fast acting operation!

ASK ABOUT IT at The Machine Tool Show—Lodge & Shipley Booth 502. Also, be sure to see the All-New Shear and Press Brake.

In Shears, Too . . . Your Lodge-ical Choice

Lodge & Shipley

Hamilton Division
Hamilton 11, Ohio

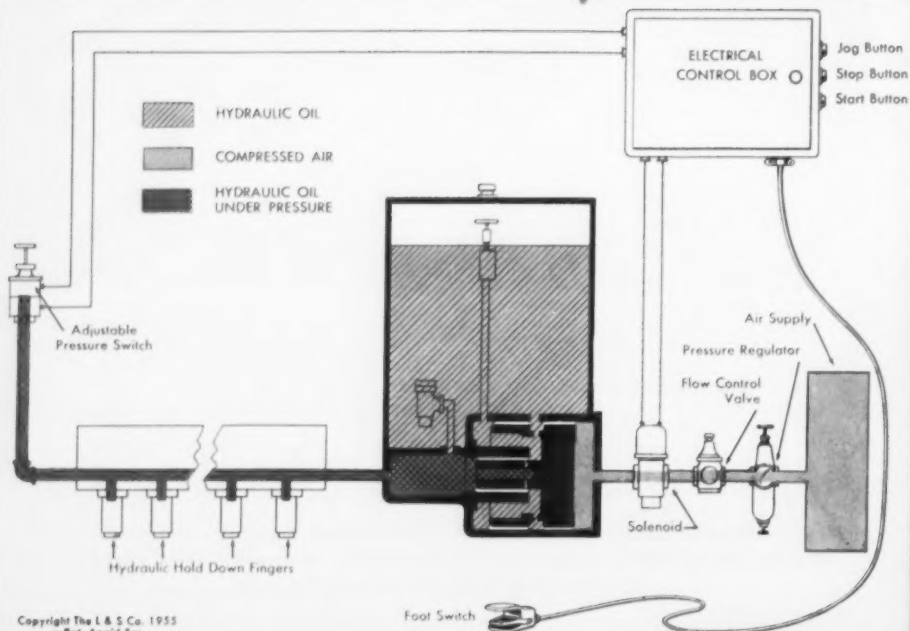
NOW . . . and exclusively from Lodge & Shipley . . . you can choose a shear with a holddown system perfectly suited to your shearing requirements.

"THE SOFT TOUCH WITH TERRIFIC HOLDING POWER"

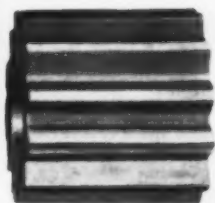
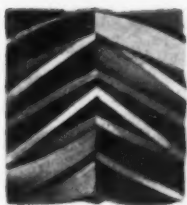


There's no impact, no damage, no noise, when the holddown lightly touches, then . . .

Tons of holding pressure are developed, before the blade starts to cut!



You can make all these gears on one machine



These are only some of the wide variety of precision gears and parts that you can make on a Farrel-Sykes "Twin-Head" generator.

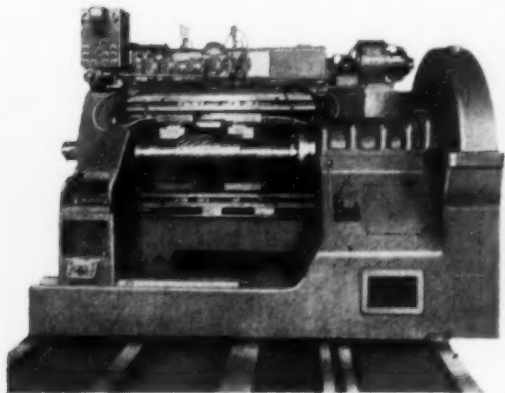
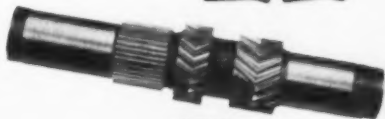
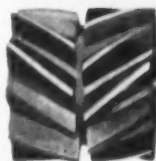
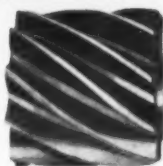
Costs will drop as the unequalled speed, accuracy and convenience of this machine keeps production flowing fast. Setups and change-overs are effected so rapidly that down-time is held to a minimum. Operators prefer the machine for its ease of operation, such as rapid selection of speeds and feeds, simple adjustment of cutters, and positive control of infeed.

Write now for details of this versatile gear generator. You will find it profitable in your shop.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

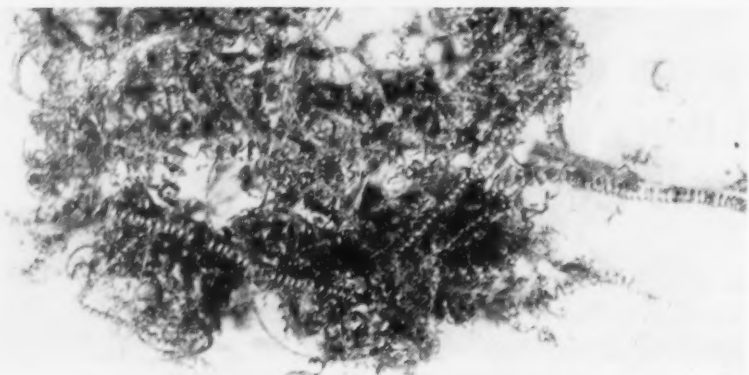
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York,
Cambridge (Mass.), Akron, Cleveland,
Chicago, Los Angeles, Houston



FB-939

For more data circle 204 on Reader Service Card



These chips (some as long as 6 inches) were cut away from the internal bore of a steel hydraulic cylinder.

FULMER

**HONING
MACHINES**

**CUT AWAY AND FINISH BORES IN
ONE CONTINUOUS OPERATION**

Here's what they do:

1. *Cut away metal or other material, producing small chips ranging from dust to the familiar curly pattern of lathe chips, depending on the finish desired.*
2. *Finish to produce accurate bores of geometric precision to tolerances as close as .0001 (\pm).*

REMOVE up to 1½ cu. inches
per minute.

for ferrous and non-ferrous
metals, glass, plastic, etc.

WRITE FOR BULLETIN ON HONING

C. ALLEN FULMER CO.

1233
FIRST
NATIONAL
BANK BLDG.
CINCINNATI
2, OHIO

For more data circle 206 on Reader Service Card

**THE
MACHINE TOOL
SHOW**
CHICAGO, ILL.
SEPT. 8-17, 1955
INTERNATIONAL AMPHITHEATRE



In Chicago...
you'll see for the first time

A NEW LINE OF GISHOLT MACHINES

Identified by
this
medallion:



The new Gisholt MASTERLINE medallion identifies this new and improved series of machines—and re-emphasizes Gisholt achievements in building the master tools of industry since 1887.



Based upon nearly 70 years of specialized experience, the new Gisholt MASTERLINE machines are ready to give you production far in advance of their time.

Come in and inspect them at close range. Watch them operate. Learn what these new Gisholts can do to cut costs on your work.

Be sure to visit the Gisholt exhibit—Booth 1413, Exhibition Hall.

GISHOLT

MACHINE COMPANY

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

90 minute exasperating now accomplished



In the illustration below, the operator shows how easy it is to balance the grinding wheel on a 10" x 72" Plain Hydraulic Grinder.

Have you ever seen an operator balance a grinding wheel mount on conventional static balancing ways? It's a tedious operation, and may require 90 minutes or more to remove wheel mount, balance and replace mount. Cincinnati did something about this. They developed automatic grinding wheel balancing that does the job ten times more accurately and infinitely quicker and easier.



CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES

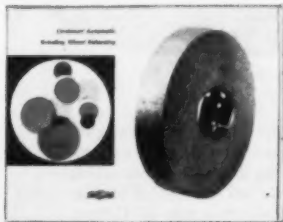
job easily in seconds



This exclusive Cincinnati feature automatically balances the grinding wheel mount on the machine . . . within a few seconds . . . while the spindle rotates at its operating speed. This exclusive Cincinnati feature eliminates vibration and resultant chatter on the work . . . permits more effective stock removal . . . reduces wheel cost per workpiece.

FILMATIC spindle bearings and automatic grinding wheel balancing constitute a team that just can't be beat for lower cost precision cylindrical grinding. Best of all, these features are *standard equipment* on CINCINNATI FILMATIC 6", 10"-L, 10", 14"-L, 14" and 16" Plain Grinders, and on 6", 10"-L, 10" and 14"-L Angular Feed Plunge Grinding Machines. Extra equipment other sizes. Write today for the complete balancing story. Ask for publication No. G-637-1.

**CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO**



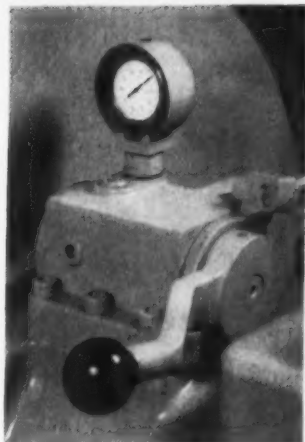
Publication G-637-1 explains the Cincinnati Automatic Balancing principle. Write for a copy.

CINCINNATI

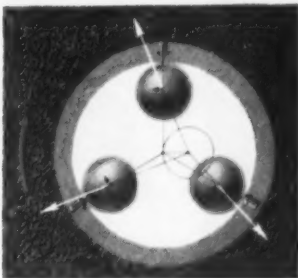
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

For more data circle 208 on Reader Service Card

August, 1955

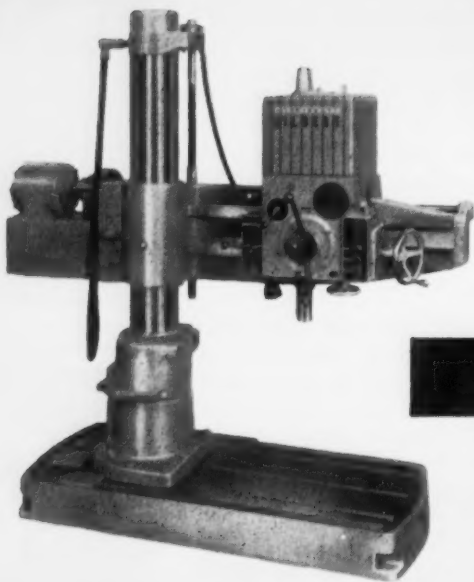


Automatic balancing control lever and indicator.



Here's how it works. Three steel balls are carried in a raceway in the wheel end of the spindle. As the spindle rotates while the elastically supported bearing assembly is unclamped, the balls are free to move and correct any unbalanced condition that may exist. Then the complete spindle and bearing assembly is locked in position to form a rigid mounting, and retain all the advantages of FILMATIC bearings for precision cylindrical grinding.

modern machine shop 9



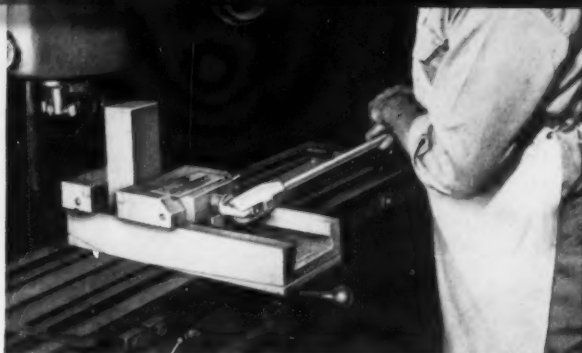
NEW

- 9" column; 3' or 4' arm
- spindle speed ratio of 40-to-1
- 12 speeds (up to 3200 rpm) through direct-reading dial
 - automatic tapping reverse
 - adjustable spring counterbalance (feel remains the same from lightest to heaviest tools)
 - hardened tang slot
- safety elevating nut and screw (arm can't drop or overrun)
- rigid, accurate spindle mounted on 5 precision ball bearings

This completely new light duty 3 HP radial gives you more advances for your money than any machine of equal capacity, at a price that makes replacement easy and attractive. At the left are some of the features that put you ahead when you own this Gilbert. Your replacement dollar is worth more when you buy a Gilbert. Write for Bulletin Number 255.
 The Cincinnati Gilbert Machine Tool Co.,
 3366 Beekman St., Cincinnati 23, Ohio

those who buy Gilbert buy **GILBERT** *again*

For more data circle 209 on Reader Service Card



**LARGE CAPACITY
HALF THE WEIGHT
MULTIPLE CLAMPING
POWER
FULLY ADJUSTABLE**

New milling vise

the only swivel vise that mounts flat on table...

The New J & S CLAMPCUT Milling Vise multiplies the clamping and holding power expected of a milling machine vise. The powerful Acme threads tighten the adjustable jaw head and the patented down holding clamping jaws multiply the pressure.

Engineered and designed for full efficiency with a minimum of weight, nothing is wasted—no part is non-functional. Many times the holding power of an ordinary vise, yet only half the weight.

**EASY TO USE
SNAPS TO WORK —
then tightens
READILY
DIS-ASSEMBLED
REVERSIBLE JAWS**

A quick-release taper swivel provides positive clamping in position with only two "T" bolts. The swivel is calibrated for full 180°.

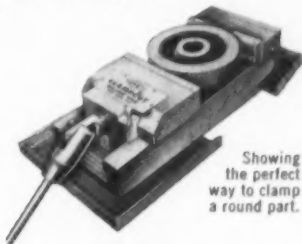
This fast loading vise is provided with exclusive "snap-on" parallels that cannot be clogged with chips.

Holds round pieces in vertical position and has adjustable stop for repeating operations quickly and accurately.

J & S CLAMPCUT Vises come in two sizes for 12" capacity and 8" capacity. Write for complete details and prices.

Quick finger release for setting and resetting any position for full range of vise.

Distributors in all industrial areas.



Showing
the perfect
way to clamp
a round part.

WHEEL DESIGN **J & S** TOOL CO. INC. JAW CLAMPS - PRECISION VISES - DOWN-HOLDING DEVICES

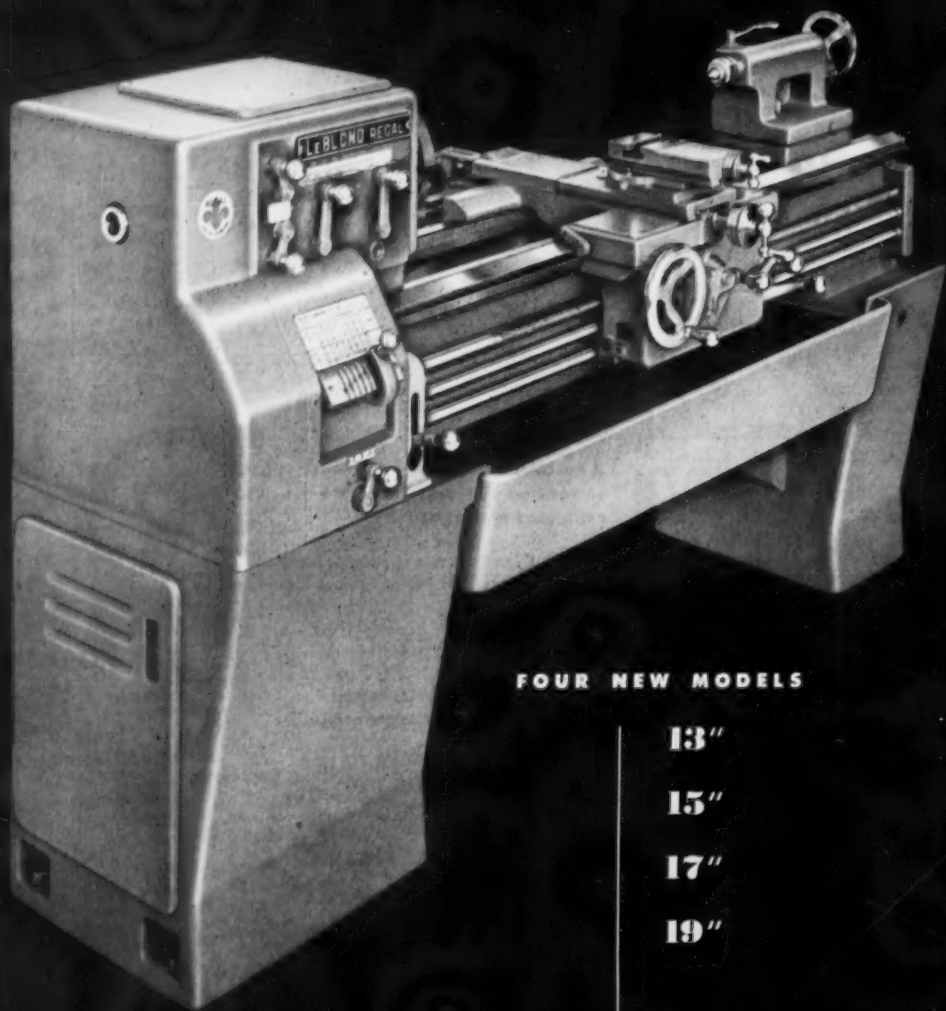
J & S TOOL CO., INC.

CLAMPCUT (SEE PAGE 10)

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

cut with confidence . . .

HERE'S THE



FOUR NEW MODELS

13"

15"

17"

19"

15" Regal shown

NEW L^EBLOND REGAL

The only lathe in its class with so many big-lathe features

Designed and built like heavy-duty lathes, the new LeBlond Regals will give you long life of precision production, minimum maintenance and the kind of dependability you'd expect from a much higher-priced machine!

Consider, for example, the new Regal headstock. It uses the same combination gear-belt drive construction that proved itself on the famous LeBlond Dual-Drive and is now incorporated on our new 16" heavy-duty lathe. Then take a look at the new bed with hardened and ground replaceable steel ways. Like the ways on our heavy-duty machines, they are fitted according to the compensating vee-way principle to insure better distribution of forces for proven long-time accuracy and minimum wear.

Again, like higher-priced lathes, Regals are equipped with *both* feed rod and leadscrew for continued accuracy in thread chasing. Other big-lathe features—3-bearing spindle. Automatically lubricated quick-change box. Wide carriage bridge with ample bearing surface. Rugged tailstock with plug clamping. Plus general dimensions and construction details patterned after LeBlond heavy-duty lathes.

Only from the builder of a complete line of lathes can you get a low-priced lathe with true big-lathe features. All of LeBlond's 68 years of experience has gone into the design and building of these new Regals. Be sure you get all the details; see your LeBlond Distributor or write for Bulletin R-200-A.

	13"	15"	17"	19"
Swing over bed and carriage wings	14"	15½"	17½"	19½"
Spindle speeds, number	12	12	12	12
Spindle speed range, rpm.	45 to 1800	30 to 1200	38 to 1500	25 to 1000
Feeds and threads, number	48	48	48	48
Feed, range, in. per rev.	.0018—106		.002—116	
Threads per inch, range	4—224		2—112	
Horsepower	2	3	3	5



SEE IT AT THE SHOW

#1313

Dead center of the new Exhibition Hall.

... cut with confidence

THE R. K. L^EBLOND MACHINE TOOL COMPANY
CINCINNATI 8, OHIO



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 68 YEARS

What's Taft-Peirce Featuring

MACHINE TOOLS

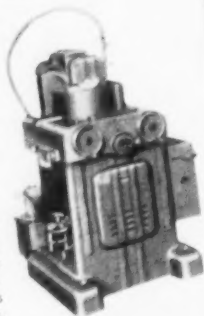
T-P NO. 1 SURFACE GRINDER

A simple spark test demonstrates how this extraordinary surface grinder repeats to .00005". Gives finishes so smooth in many cases they seal without lapping.



T-P 6" ROTARY SURFACE GRINDER

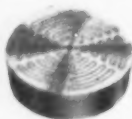
Repeats to .00005". Wheel-Repeats up to 30 degrees; head tilts up to 30 degrees; work spindle and magnetic chuck tilt 7 1/2 degrees. Adapters for sharpening Fellows Gear Shaper Cutters available.



MAGNETIC CHUCKS

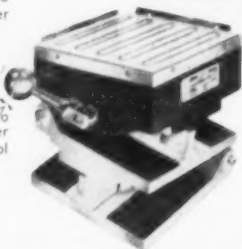
T-P SUPERPOWER MAGNETIC CHUCKS

Taft-Peirce offers a complete line of work-designed chucks with maximum power and dependability.



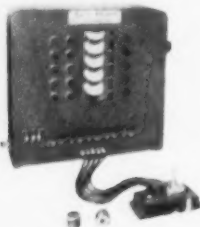
T-P SUPERPOWER PERMANENT MAGNET CHUCKS

are longer, stronger, 20% lower — give greater clearance on machine tool tables.



T-P COMPUTING COMPAIRATOR AIR GAGES

Utilizing the more versatile, more dependable circuit of T-P standard air gages, a Computing CompAIRator solves simple problems — simplifies many complex measurements.



T-P AIR-ELECTRIC COMPAIRATOR AIR GAGES

speed multiple inspection jobs. Lights flash to indicate out-size dimensions. Dials give exact size.

AIR GAGES

at the Machine Tool Show

FIXED GAGES



T-P ROTOCHK

cuts thread gaging time by $\frac{2}{3}$. Push — and gage screws into work. Pull — and it disengages.

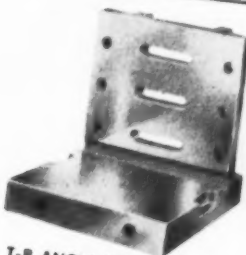
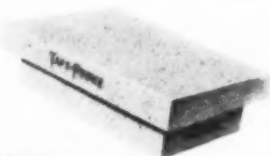
T-P PLUG, RING, SNAP GAGES

Taft-Peirce offers hundreds of different fixed gages, standard or special. One for every gaging job.



T-P GRANITE SURFACE PLATES

offer maximum accuracy with longer life. Cast Iron Plates and stands also available.



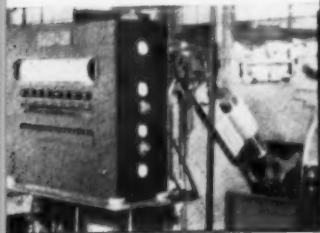
T-P ANGLE IRONS AND SINE CHECKING EQUIPMENT

are just some of the many time-and-labor-saving devices that will be exhibited at the Show.

TOOL ROOM EQUIPMENT

T-P AUTOMATIC COMPAIRATOR AIR GAGES

make 100% quality control possible in mass production. Automatically inspects, rejects out-size parts.



See them in action
at the Show
Booth 811

THE TAFT-PEIRCE MANUFACTURING COMPANY



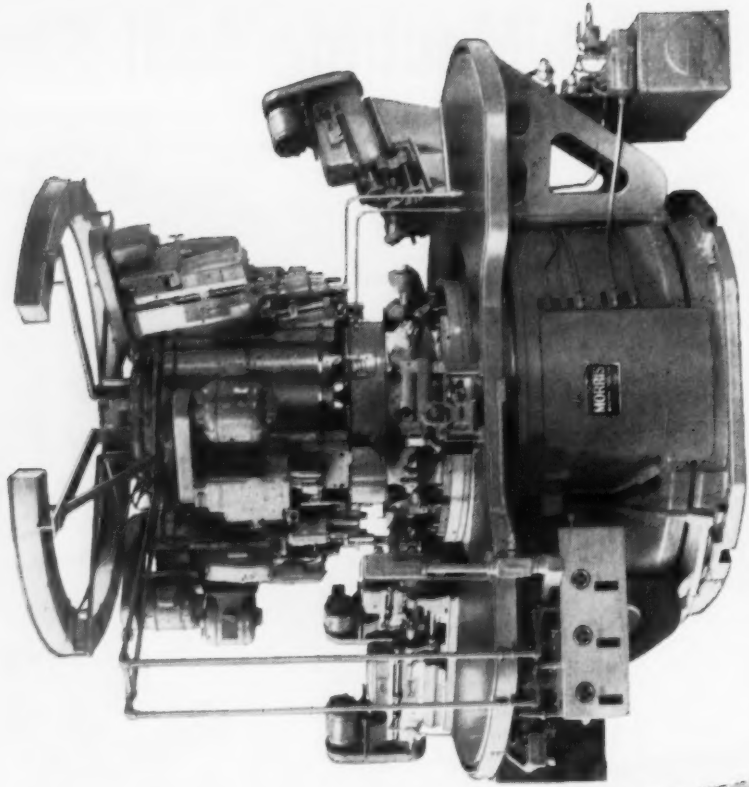
*T-P means
Top Precision*

WOONSOCKET, RHODE ISLAND

For more data circle 214 on Reader Service Card

**Eliminates
model
change-over
problems!**

**a production
machine—with
standard units—
quick change-over
features—for each
year's design change.
completely automatic—
requires only part
loading and unloading.**



Morris Unit-Type Machine Tools provide specialized machining; use standard components; add flexibility to your high speed mass production operations.

Unit type construction provides for re-alignment for model alterations or for new models. No longer any need to scrap an entire machine!

MORRIS MOR-SPEED PRODUCTION MACHINE . . . drills, burs, reams, taps, spotfaces carburetor air horns . . . 375 pieces per hour at 80% efficiency.

Basic construction provides a stationary center column and Morris AIR-OIL-MATIC Drill Units mounted on the column and on the removable platen. Parts are placed in air-power clamped fixture by the operator. The table indexes automatically through 12 stations, controlled by hydraulic indexing mechanism, 24 operations on 21 holes on 4 perpendicular faces and one angular face are performed on each piece. Operator merely loads unfinished pieces, unloads completed parts.

Write for new detailed descriptive literature . . . or outline your mass production problem involving drilling or related operations for prompt attention by MORRIS engineers.

MORRIS AIR-OIL-MATIC DRILL UNITS

- Adjustable Feed, Stroke and Rapid Approach
- Trouble-free Hydraulic System
- Wide Range of Spindle Speeds • Convenient Controls
- Air or Oil Powered • Hydraulically Controlled

Designed for a wide range of drilling, reaming, chamfering, spot-facing, hollow milling, centering and related operations, the unit can be mounted in vertical,

angular or horizontal positions.

Controls may be set to provide almost any sequence of operation. Available for use in special purpose machines like the production machine illustrated.



VISIT US AT BOOTH #912
THE MACHINE TOOL SHOW
Chicago, Illinois, Sept. 6-17, 1955
International Amphitheater



Morris

THE MORRIS MACHINE TOOL CO.
934 HARRIET STREET • CINCINNATI 3, OHIO

Your wiping problems increase in hot weather...



ABSORPTION
is amazing . . .
"Perf-Embossed"®
texture gives Scott
Wipers their dirt-
gripping, oil-drink-
ing power



another reason for switching to **Scott Wipers**

This remarkable new product protects men and metal... steps up efficiency all year around!

Because a fresh one is always available—Scott Wipers provide a constant source of clean wiping material.

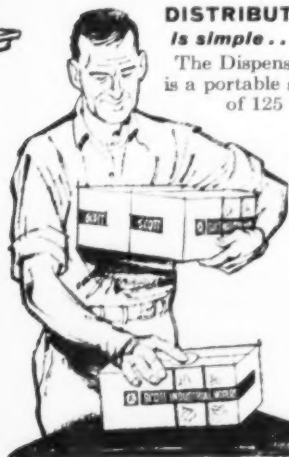
Scott Wipers are sanitary and disposable. They end the laundering problem... simplify distribution and control.

Compare them with whatever wiping material you're using now—for cost, convenience, performance.

The Scott representative or distributor in your area stands ready to help you set up a production line demonstration in your plant. Call him or mail this coupon today.

DISTRIBUTION is simple...

The Dispenser-box is a portable supply of 125 wipers



**And, best of all,
Scott Wipers are
DISPOSABLE!**



SCOTT PAPER COMPANY

Dept. MM-C, Chester, Pa.

Please send me full information on
Scott Industrial Wipers.

Name _____

Company _____

Address _____

City _____ State _____

For more data circle 218 on Reader Service Card

famco MACHINES

pay real cost-saving dividends



Famco Machines—the choice of more and more leaders in the metal-working industry. This ever-increasing stamp of approval is in recognition of the superior quality built into every Famco Machine.

POWER PRESSES

Open back inclinable, standard and deep throat in bench and floor models. Ratings range from 4 to 18 tons capacity. Larger models feature the revolutionary and exclusive Famco "Elecromatic" 9-point jaw clutch.

ARBOR PRESSES

Plain lever, simple ratchet, and combination compound and simple ratchet models—bench and floor models, deliver up to 15 tons pressure.

DRILL PRESSES

28 models of 15" presses in single and multiple spindle; tilting table and production models, bench and floor types.

AIR PRESSES

20 models, bench and floor types, $\frac{1}{4}$ to $3\frac{1}{4}$ tons capacity. Built-in electric or air controls, single or dual control type.

FOOT PRESSES

Constructed of semi-steel close grained castings; precision-machined for long, unsurpassed, trouble-free operation. 10 bench and floor models that deliver up to $3\frac{1}{4}$ tons pressure.

BAND SAWS

4 models of horizontal cut-off saws for dry or wet cutting, with or without coolant system. Capacity: 6" round and 6" x 12" rectangular stock.

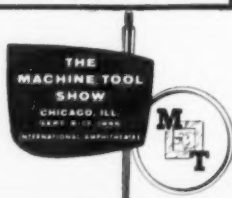
SQUARING SHEARS

18 models, modern all steel construction, shear up to 14 gauge mild steel; cutting widths 22 to 52 in. Power models feature single stroke mechanism and the exclusive Famco "Electro-Matic" 9-point jaw clutch.

SEE THE LATEST ADDITIONS TO OUR LINE!



FIRST SHOWING
BOOTH NO. 507
AT THE
MACHINE TOOL
SHOW



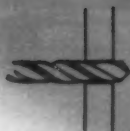
famco machine company

3122 SHERIDAN ROAD • KENOSHA 85, WISCONSIN

Air Presses • Arbor Presses • Band Saws • Drill Presses • Foot Presses
Power Presses • Squaring Shears

For more data circle 219 on Reader Service Card

**SEE
AUTOMATION
IN
ACTION**



Lo-swing

**EXHIBIT
SPACE 1013**



NEW LATHES



A NEW DRILLING HEAD



A NEW AUTOMATIC LOADER

A NEW DRILLING, REAMING,
AND TAPPING MACHINE



**THE
MACHINE TOOL
SHOW**

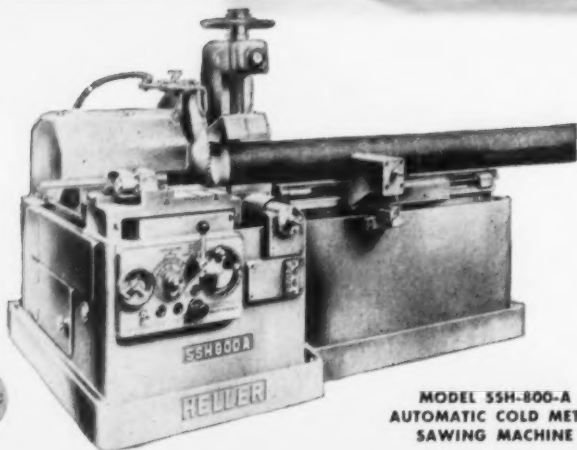
CHICAGO, ILL.

SEPT. 6-17, 1955

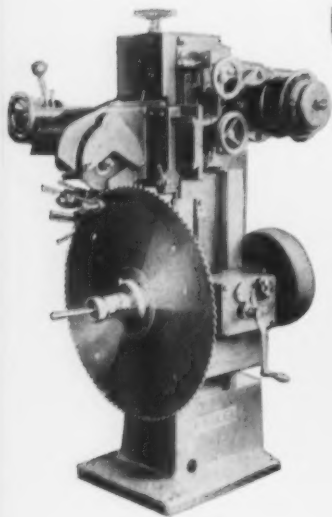
INTERNATIONAL AMPHITHEATRE



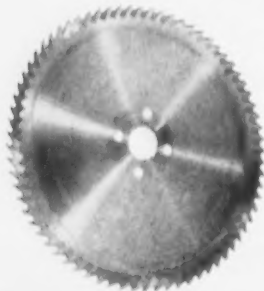
SENECA FALLS MACHINE COMPANY • SENECA FALLS, N. Y.



MODEL 55H-800-A
AUTOMATIC COLD METAL
SAWING MACHINE



MODEL B-650
AUTOMATIC SAW SHARPENING
MACHINE



HELLER GIVES YOU COMPLETE SERVICE
WITH EXACTLY CORRECT BLADES.

**CENTRALIZED
RESPONSIBILITY**
assures
TRIPLE ECONOMY
with **HELLER**

1. The Cold Sawing Machine
2. The Blade Sharpener
3. The Circular Sawblade

Economies are effected on every operation involved in cold metal sawing by taking advantage of the complete service available through Heller.

The specific savings offered by use of the combination of Heller Cold Metal Saws, Heller Blade Sharpeners and recommended Sawblades becomes accumulative when used with each other.

HELLER MACHINE COMPANY, 114 Liberty St., New York 6, N. Y.

**KNEE AND PLANER TYPE MILLING MACHINES • RADIAL AND COLUMN
DRILLING MACHINES • TRANSFER MACHINES • SPECIAL MACHINES**



**do you have
OIL SEAL TROUBLES?**

**SUPERFINISH
can solve them!**

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished*, and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for the booklet
"Wear and Surface Finish."

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



Superfinished ▶



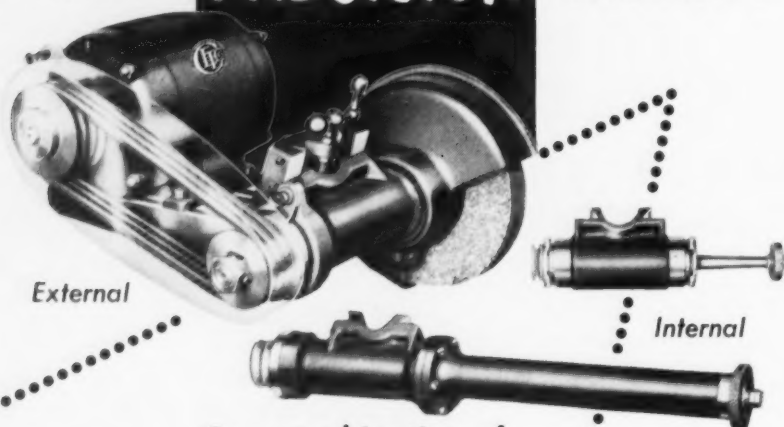
◀ **Superfinished**

GISHOLT
MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

VERSATILE **PRECISION** GRINDING!



Or a combination of
both . . . or specials for single
purpose application

Constant speed motor delivers consistent spindle speed under any load within rated capacity. External and internal grinding heads are interchangeable . . . internal spindles reversible for either left or right precision grinding . . . direction of rotation changed to suit. Large, flat mounting pad (with ample bolt slots) adds to grinder's versatility . . . can be mounted to nearly any other production machine for a wide range of accurate work, large or small. For adaptation to special, single purpose applications, write for details. Successfully used for grinding both the common and unusual materials.

Write for
Catalog No. 55-LA

The Cincinnati
TRADE MARK

**The CINCINNATI ELECTRICAL
TOOL COMPANY
CINCINNATI 8, OHIO**

For more data circle 223 on Reader Service Card



PUNCHES..

with a large



saving

We have long specialized in precision manufacture, including drill bushings and aircraft parts.

Beginning several years back, our experience and know-how was brought to bear in developing a line of punches which, by virtue of sound engineering, have proved to be truly outstanding.

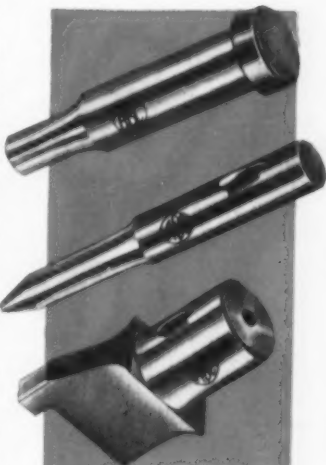
THE STANDARD LINE OF A • B • C punches is made from high alloy material which delivers longer service than that of the more commonly used water hardening steel. However, A • B • C heat treatment is so exactly done that these punches are tough and highly shock resistant.

This A • B • C material is characterized by relatively *deep hardening properties*, so that grinding or re-sharpening causes no loss of the initial high qualities of the punch.

FOR *PREMIUM* PERFORMANCE a molybdenum high speed steel is used and, to meet the most severe applications, these *high speed steel* punches can be treated by our special and exclusive process known as "Lubri-Finish". This processing removes all grinding lines and also imparts lubricity to the punch point.

TESTS RUN BY MAJOR PUNCH USERS in the U. S. have conclusively demonstrated that \$-for-\$ invested, A • B • C punches consistently outperform all others.

The A • B • C punch line is **COMPLETE**
It includes **HEAD TYPE, BALL LOCK**
and all varieties of points: Rounds, Pilots, Squares, Oblongs and special shapes



Write for
free catalog
which
contains valuable
information

ACCURATE BUSHING COMPANY

Department T-E

Main Office and Factory

433 North Avenue, Garwood, New Jersey • WEstfield 2-6400

Engineering Office and Regional Warehouse

5722 W. Chicago Ave., Chicago 51 • ESterbrook 8-7180

For more data circle 224 on Reader Service Card

AGAIN . . . LATHE LEADERSHIP FROM LODGE & SHIPLEY

15

NEW

PowerTurn LATHE

Exclusive new —

Computing

HEAD

. . . fast, fool-proof indication
of correct speed settings!

Centri-trol
CONTROLS

. . . all controls conveniently
grouped, distinctively shaped!

Turning problems into production is a built-in specialty of these New Lodge & Shipley POWERTURN Lathes. From headstock to tailstock and down to the floor POWERTURN Lathes are designed to facilitate turning to new, higher levels of profitable operation.

The many new features add importantly to Lodge & Shipley Lathe ability to produce more at lower cost.

New POWERTURN Lathes are produced in 13", 16", and 20" Standard Engine, Toolmaker, Gap, Manufacturing and COPYMATIC types.

Write for new literature on POWERTURN Lathes newest and best from *The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.*

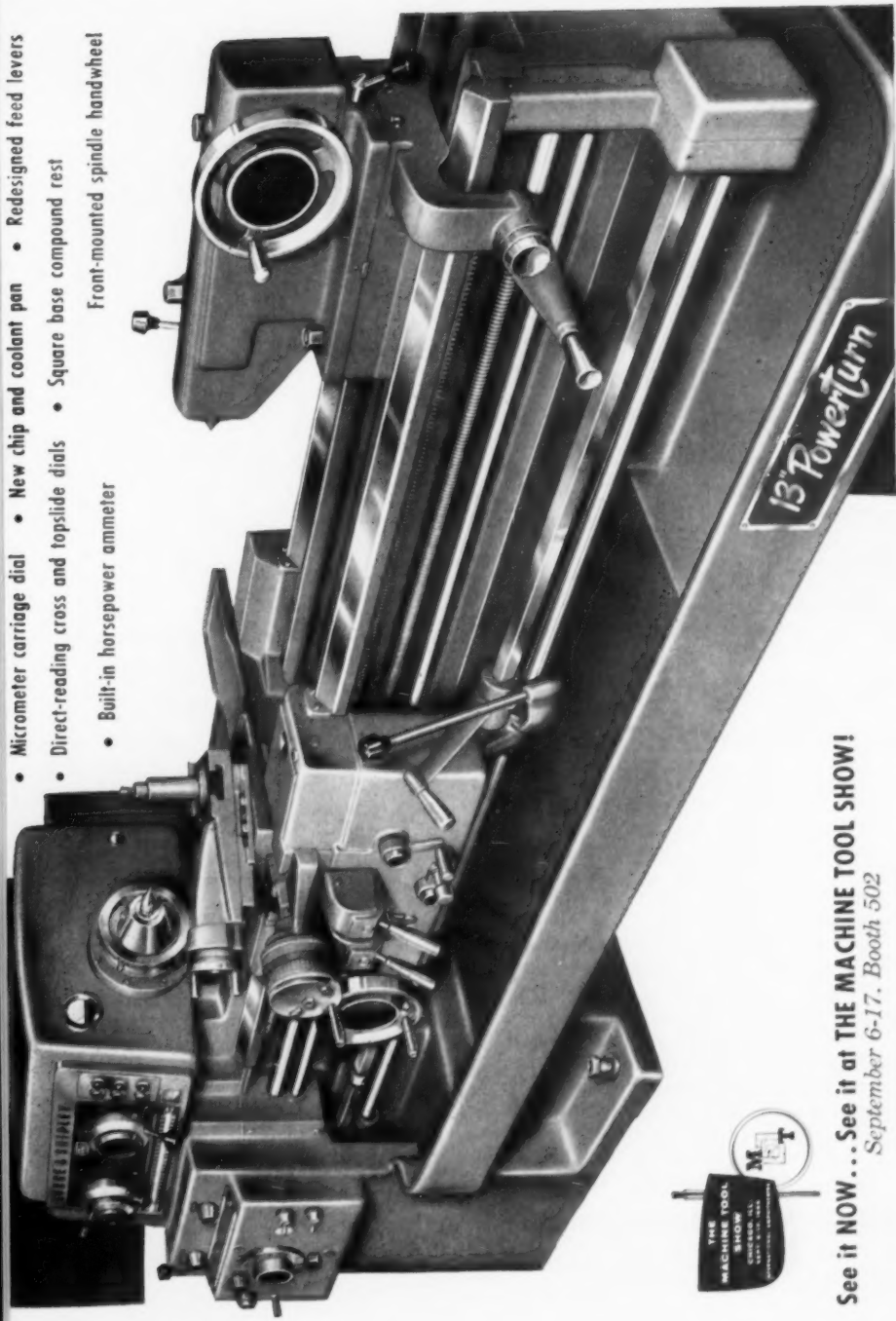
Features

- Positive brake
- Greater swing over cross slide
- Micrometer carriage dial
- New chip and coolant pan
- Redesigned feed levers

...all symbols conveniently grouped, distinctively shaped!

Features

- Positive brake
- Greater swing over cross slide
- Micrometer carriage dial
- New chip and coolant pan
- Redesigned feed levers
- Direct-reading cross and topslide dials
- Square base compound rest
- Built-in horsepower ammeter
- Front-mounted spindle handwheel!



See it NOW... See it at THE MACHINE TOOL SHOW!
September 6-17, Booth 502



No Job too big or too tough ... for MARVEL "Giant" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further ma-

chining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work*.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

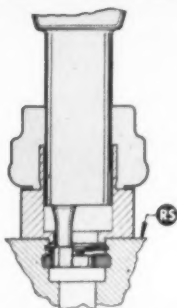
Write for Catalog



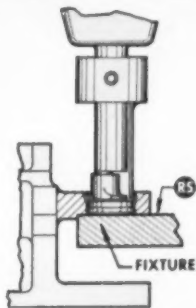
ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.

For more data circle 227 on Reader Service Card

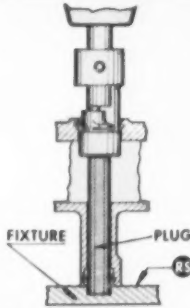
Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

Amazingly versatile! Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool, because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

Wide Cutting Range! The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

Send Your Problems to Waldes! Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool



WALDES
TRUARC
GROOVING TOOL

Made by the Manufacturers of Waldes Truarc Retaining Rings
WALDES KOHINOOR, INC., 47-16 Austel Place, L.I.C. 1, N.Y.

Waldes Truarc Grooving Tool Manufactured
Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.

Please send me your new 20-page technical manual
on the Waldes Truarc Grooving Tool. MM 087

Name

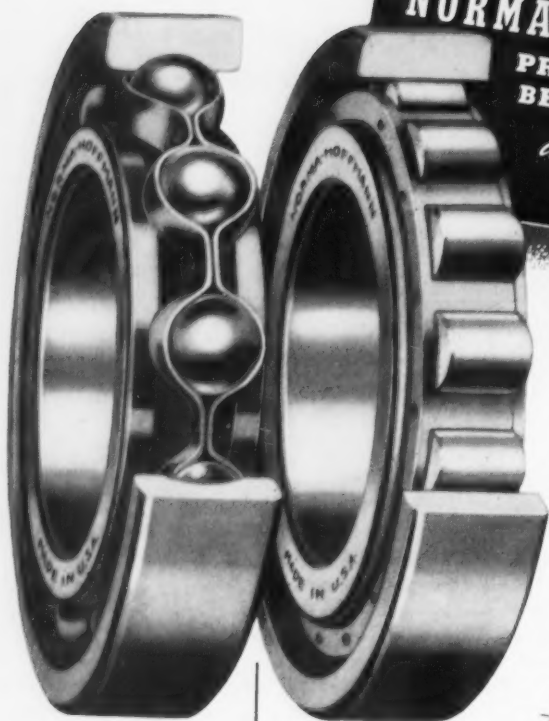
Title

Company

Address

City Zone State

For more data circle 228 on Reader Service Card



NORMA-HOFFMANN BALL BEARINGS

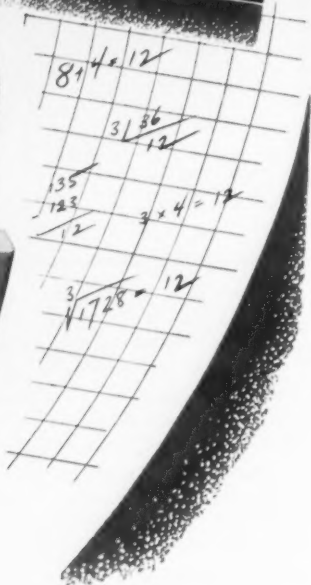
Rugged—thoroughly dependable for carrying thrust and radial loads.

NORMA-HOFFMANN ROLLER BEARINGS

Short, cylindrical roller design... heavy-duty bronze retainer... lowest possible co-efficient of friction under heavy load.

Norma-Hoffmann heavy-duty Bearings improve the design and performance of products wherever they are used. They are dependable, give friction-free smoothness and quietness of operation. Available in a wide range of sizes for every load, speed and duty. Write for catalog and engineering assistance.

Any way you figure it
NORMA-HOFFMANN
PRECISION
BEARINGS
are the Right Answer

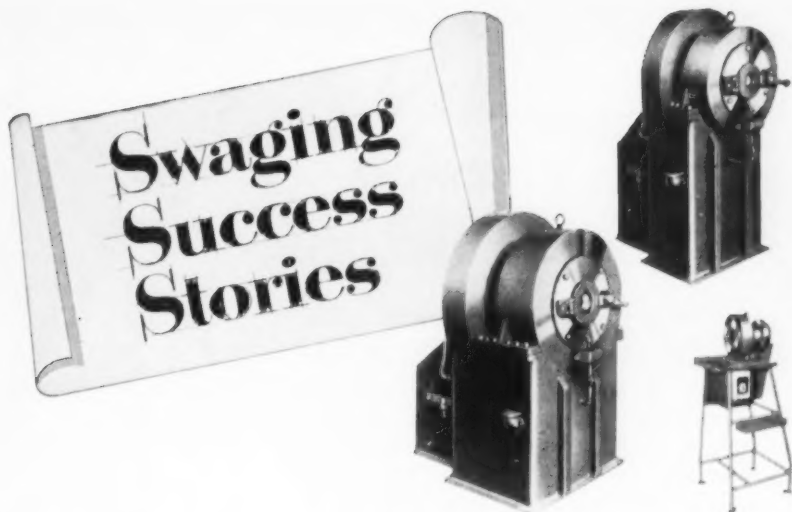


NORMA-HOFFMANN Precision BEARINGS

BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT—Founded in 1911
FIELD OFFICES: Atlanta, Chicago, Cincinnati,
Cleveland, Dallas, Denver, Detroit, Kansas City,
Los Angeles, San Francisco, Seattle.

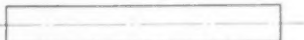
For more data circle 229 on Reader Service Card



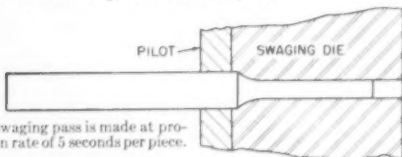
37% Savings in Material...by swaging



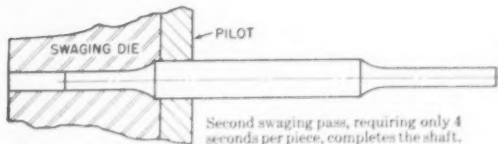
Here's a steel shaft (shown half-size) that was originally produced by turning. A switch to swaging resulted in a 37% material saving.



This is the blank for swaging. Blank for turning was same diameter—but the full length of the finished piece.



First swaging pass is made at production rate of 5 seconds per piece.



Second swaging pass, requiring only 4 seconds per piece, completes the shaft.

Check these advantages of swaging

substantial savings in material
high burnished finish
close tolerances—accurate to $\pm .001$
savings in labor—through higher production rate and use of unskilled labor

Write for our informative booklet on swaging. It contains detailed descriptions of the Torrington Rotary Swagers. You may find that swaging offers important advantages over your present fabrication methods.



THE TORRINGTON COMPANY

Swager Department
720 North Street, Torrington, Conn.
Makers of Torrington Needle Bearings

TORRINGTON ROTARY SWAGING MACHINES

For more data circle 230 on Reader Service Card

When you want to know

...ask a
SPECIALIST!

We make nothing but circular metal cutting saws — the finest you can buy, though they cost no more. All our resources for research and production are devoted to this specialty. Our representatives, too, are specialists on metal-cutting problems throughout industry, with particular reference to the new problems of automation. When you need authoritative advice, we're at your service.

Consult **CIRCLE R Specialists** in:

BURBANK	INDIANAPOLIS	PHOENIX
CHICAGO	KANSAS CITY	PITTSBURGH
CLEVELAND	MILWAUKEE	PROVIDENCE
DAYTON	NEW YORK CITY	ROCHESTER
DETROIT	PHILADELPHIA	ST. LOUIS
	MONTREAL	



CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Specialists in
Circular Cutting Tools Since 1923

METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLOTTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELERS' SLOTTING SAWS
CUT OFF SAWS • CIRCULAR
KNIVES • ROTARY SHEAR
BLADES • CIRCOLOY STEEL
SAWS • SOLID & TIPPED
TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNT-
ERSINKS • CENTER REAMERS

For more data circle 231 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

(PLEASE PRINT PLAINLY)

August 1955 Issue

GOOD UNTIL OCTOBER 1, 1955

Your Name _____

Company Name _____

Company Address _____

Your Title _____

City _____

Zone _____

State _____

431 Main Street
Cincinnati 2, Ohio

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

EDITORIAL ITEMS

1	21	41	61	81	101	121	141
2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	158
19	39	59	79	99	119	139	159
20	40	60	80	100	120	140	160

ADVERTISEMENTS

	First Cover	Second Cover	Third Cover	Fourth Cover
201	220	239	258	277
202	221	240	259	278
203	222	241	260	279
204	223	242	261	280
205	224	243	262	281
206	225	244	263	282
207	226	245	264	283
208	227	246	265	284
209	228	247	266	285
210	229	248	267	286
211	230	249	268	287
212	231	250	269	288
213	232	251	270	289
214	233	252	271	290
215	234	253	272	291
216	235	254	273	292
217	236	255	274	293
218	237	256	275	294
219	238	257	276	295
220	239	258	277	296
221	240	259	278	297
222	241	260	279	298
223	242	261	280	299
224	243	262	281	300
225	244	263	282	301
226	245	264	283	302
227	246	265	284	303
228	247	266	285	304
229	248	267	286	305
230	249	268	287	306
231	250	269	288	307
232	251	270	289	308
233	252	271	290	309
234	253	272	291	310
235	254	273	292	311
236	255	274	293	312
237	256	275	294	313
238	257	276	295	314
239	258	277	296	315
240	259	278	297	316
241	260	279	298	317
242	261	280	299	318
243	262	281	300	319
244	263	282	301	320
245	264	283	302	321
246	265	284	303	322
247	266	285	304	323
248	267	286	305	324
249	268	287	306	325
250	269	288	307	326
251	270	289	308	327
252	271	290	309	328
253	272	291	310	329
254	273	292	311	330
255	274	293	312	331
256	275	294	313	332
257	276	295	314	333
258	277	296	315	334
259	278	297	316	335
260	279	298	317	336
261	280	299	318	337
262	281	300	319	338
263	282	301	320	339
264	283	302	321	340
265	284	303	322	341
266	285	304	323	342
267	286	305	324	343
268	287	306	325	344
269	288	307	326	345
270	289	308	327	346
271	290	309	328	347
272	291	310	329	348
273	292	311	330	349
274	293	312	331	350
275	294	313	332	351
276	295	314	333	352
277	296	315	334	353
278	297	316	335	354
279	298	317	336	355
280	299	318	337	356
281	300	319	338	357
282	301	320	339	358
283	302	321	340	359
284	303	322	341	360
285	304	323	342	361
286	305	324	343	362
287	306	325	344	363
288	307	326	345	364
289	308	327	346	365
290	309	328	347	366
291	310	329	348	367
292	311	330	349	368
293	312	331	350	369
294	313	332	351	370
295	314	333	352	371
296	315	334	353	372
297	316	335	354	373
298	317	336	355	374
299	318	337	356	375
300	319	338	357	376
301	320	339	358	377
302	321	340	359	378
303	322	341	360	379
304	323	342	361	380
305	324	343	362	381
306	325	344	363	382
307	326	345	364	383
308	327	346	365	384
309	328	347	366	385
310	329	348	367	386
311	330	349	368	387
312	331	350	369	388
313	332	351	370	389
314	333	352	371	390
315	334	353	372	391
316	335	354	373	392
317	336	355	374	393
318	337	356	375	394
319	338	357	376	395
320	339	358	377	396
321	340	359	378	397
322	341	360	379	398
323	342	361	380	399
324	343	362	381	400
325	344	363	382	401
326	345	364	383	402
327	346	365	384	403
328	347	366	385	404
329	348	367	386	405
330	349	368	387	406
331	350	369	388	407
332	351	370	389	408
333	352	371	390	409
334	353	372	391	410
335	354	373	392	411
336	355	374	393	412
337	356	375	394	413
338	357	376	395	414
339	358	377	396	415
340	359	378	397	416
341	360	379	398	417
342	361	380	399	418
343	362	381	400	419
344	363	382	401	420
345	364	383	402	421
346	365	384	403	422
347	366	385	404	423
348	367	386	405	424
349	368	387	406	425
350	369	388	407	426
351	370	389	408	427
352	371	390	409	428
353	372	391	410	429
354	373	392	411	430
355	374	393	412	431
356	375	394	413	432
357	376	395	414	433
358	377	396	415	434
359	378	397	416	435
360	379	398	417	436
361	380	399	418	437
362	381	400	419	438
363	382	401	420	439
364	383	402	421	440
365	384	403	422	441
366	385	404	423	442
367	386	405	424	443
368	387	406	425	444
369	388	407	426	445
370	389	408	427	446
371	390	409	428	447
372	391	410	429	448
373	392	411	430	449
374	393	412	431	450
375	394	413	432	451
376	395	414	433	452
377	396	415	434	453
378	397	416	435	454
379	398	417	436	455
380	399	418	437	456
381	400	419	438	457
382	401	420	439	458
383	402	421	440	459
384	403	422	441	460
385	404	423	442	461
386	405	424	443	462
387	406	425	444	463
388	407	426	445	464
389	408	427	446	465
390	409	428	447	466
391	410	429	448	467
392	411	430	449	468
393	412	431	450	469
394	413	432	451	470
395	414	433	452	471
396	415	434	453	472
397	416	435	454	473
398	417	436	455	474
399	418	437	456	475
400	419	438	457	476
401	420	439	458	477
402	421	440	459	478
403	422	441	460	479
404	423	442	461	480
405	424	443	462	481
406	425	444	463	482
407	426	445	464	483
408	427	446	465	484
409	428	447	466	485
410	429	448	467	486
411	430	449	468	487
412	431	450	469	488
413	432	451	470	489
414	433	452	471	490
415	434	453	472	491
416	435	454	473	492
417	436	455	474	493
418	437	456	475	494
419	438	457	476	495
420	439	458	477	496
421	440	459	478	497
422	441	460	479	498
423	442	461	480	499
424	443	462	481	500
425	444	463	482	501
426	445	464	483	502
427	446	465	484	503
428	447	466	485	504
429	448	467	486	505

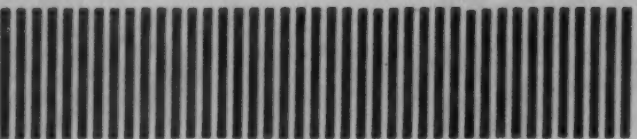
FIRST CLASS
PERMIT No. 7414
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

4c POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**BOX 74
VILLAGE STATION
NEW YORK 14, NEW YORK**





Form or Dress
Your Tool Wheels
in a jiffy

with a **NORBIDE[®]** Dressing Stick

JUST a couple of passes with a handy NORBIDE Dressing Stick is all it takes to clean up a wheel face, dress a radius or groove or touch up a cup or saucer wheel. And with this conveniently sized stick you can see more of the wheel and thus avoid costly overdressing.

A NORBIDE Stick of boron carbide—the hardest material made by man—will outlast hundreds of ordinary abrasive sticks. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor or write for Form 1567 giving more details.

NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.



*Next to the diamond in hardness—
available at a fraction of diamond cost*

For more data circle 232 on Reader Service Card

\$2,190* PUTS A BRAKE LIKE THIS
TO WORK IN YOUR PLANT



BIG
16 ga. x 78"
CAPACITY
(25 TONS)

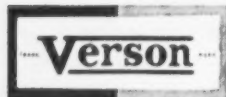
AVAILABLE
FROM STOCK

Now you can buy a full power press brake as easily as buying a new automobile. Just pick out the standard model you want, send an order and your brake will be shipped from stock. Two models to choose from — the 16-48 has a capacity of 16 ga. x 48" and is priced at \$1,455.00*; the 1062, shown above, has a capacity of 16 ga. x 78" and is priced at \$2,190.00*. Write for specs.

During the Chicago Shows be sure and visit the birthplace of the allsteel press.

*F.O.B. Chicago

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

For more data circle 233 on Reader Service Card

.....you're Invited to.....

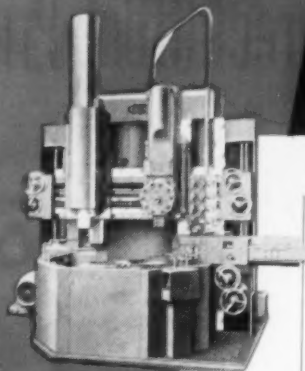
BOOTH 1213

**THE
MACHINE TOOL
SHOW**

CHICAGO, ILL.
SEPT. 8-11, 1955
INTERNATIONAL EMPLOYMENT

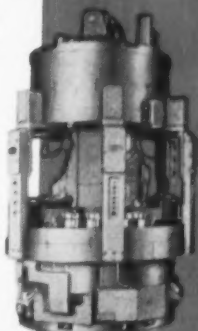
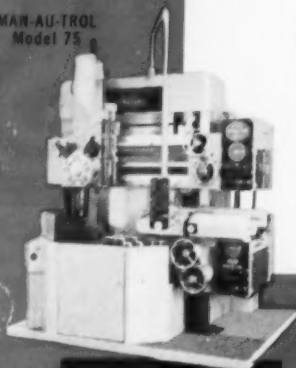


You will see
the most
Modern Line
of
Machine Tools
available to the
Metal Working
Industries

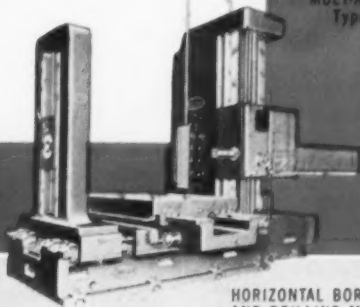


**CUT MASTER
V.T.L.
Model 75**

**MAN-AU-TROL
Model 75**



**MULT-AU-MATIC
Type "L"**



**HORIZONTAL BORING, MILLING
AND DRILLING MACHINE**

Model 75

WE INVITE YOUR INQUIRIES
CALL OR WRITE YOUR NEAREST
BULLARD SALES OFFICE, DISTRIBUTOR OR . . .



**THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT**

For more data circle 234 on Reader Service Card

With the **NEW Fosdick Jig Borer . . .**

Dial Dimensions Direct from Print

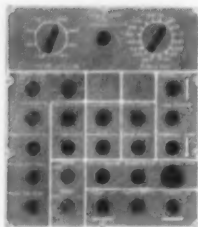
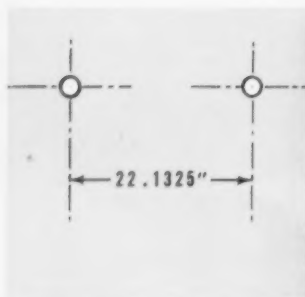
This is

**DIRECT
DIMENSION**

Measuring!

● This new and exclusive measuring system is the simplest, the most direct ever conceived for a jig borer! It will measure with precision to $\pm .0001"$ And the operator need not be highly skilled.

Dimensions from the blueprint are simply set on direct-reading drum dials, one for longitudinal, the other for transverse position. Easily-read numerical dials minimize errors. The finest Class 'A' gages permanently sealed against dust and never handled by the operator provide consistent precision.



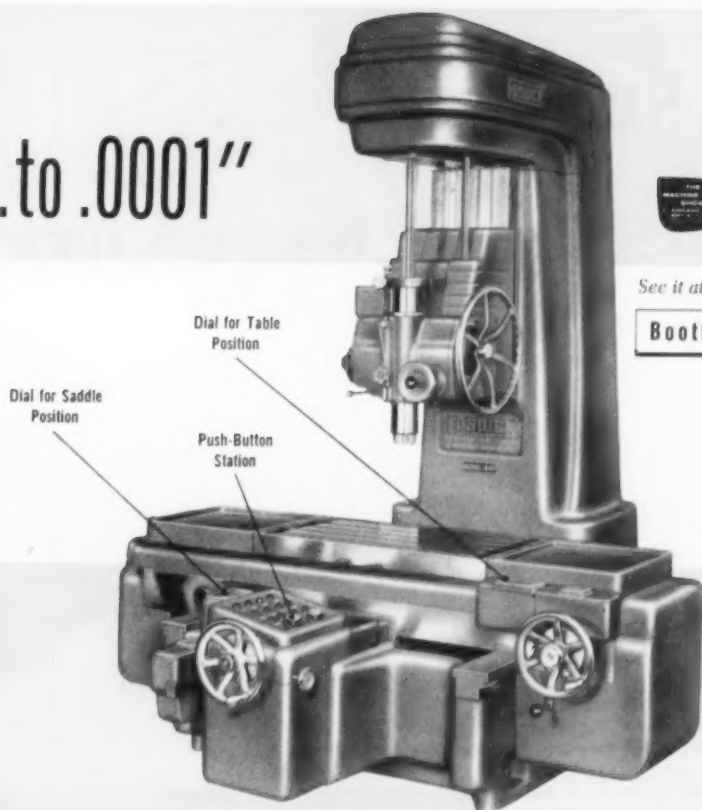
Press a Button . . . Table and Saddle Position Automatically!

Once dials are set, press the positioning button. Table and saddle will automatically position themselves to the dimensions set on the dials. We guarantee accuracy of $\pm .0001"$!

In addition, push-button station controls spindle feeds and speeds; milling feeds to table and saddle; electric clamp to table and saddle; rapid traverse to table, saddle and quill; emergency stop.

NEED DRILLING EQUIPMENT? GET A PROPOSAL FROM FOSDICK!

...to .0001"



See it at the Show

Booth 1402

Like the scores of Fosdick Jig Borers in plants throughout the U. S., this new machine will perform consistently to $\pm .0001"$ in measured table and saddle position as well as hole size. In addition, a new degree of speed and convenience has been attained in our exclusive Direct Dimension measuring system.

Other major advancements in this machine contribute to a long life of consistent precision performance. Our new quill bearing design locates ball races

permanently at top and bottom of head, regardless of quill position. Gears are hardened and ground and are operated by magnetic clutches.

Other features include—16 spindle speeds and 8 feeds, both *preselected* from push-button station. Rapid Traverse to head with electric clamping. Rapid traverse to quill (extra). Electronically-controlled milling feeds from $\frac{3}{8}"$ to 15" per minute. Table sizes—23" x 44", 23" x 54".

Write today for bulletin containing full description.



Radial Drills



Jig Borers



Sensitive and Upright Drills



Sensitive Radial Drills



Automatic Positioning Machines

FOSDICK

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

For more data circle 236 on Reader Service Card

August, 1955

modern machine shop 37

JOB SHOPS

TAKE NOTE!

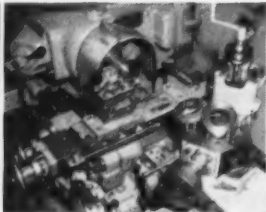
**303 Stainless Steel—
All finishes held to 16 RMS or better**

**LEE ENGINEERING CO.,
BALTIMORE,
TOOK THIS ORDNANCE JOB
ON SUB-CONTRACT.**

"Job shops" might well be called "tough-job shops". Specifications must be "on the nose", bids must be low, and still there must be a profit. It calls for smart management plus good equipment.

Consider this case. It was a tough job, but the winning bid was made with confidence. Lee *knew* that this job would be "duck soup" for their new J&L Ram Type Turret Lathe . . . All production commitments were met with ease — just another example of a "job shop" operation made *profitable* through the use of the versatile Jones & Lamson Universal Turret Lathe.

The piece is machined in two operations on the same lathe without tooling changes.



Send today for J&L's Machine Tool Replacement Information Kit (the low-down on tax depreciation, financing plans and machine tools).

JONES & LAMSON

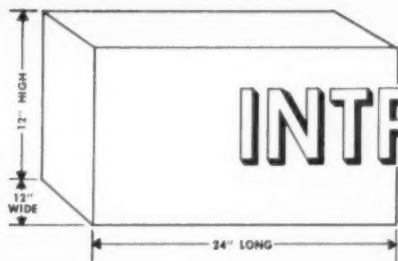
*Machine Tool Craftsmen
Since 1835*

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

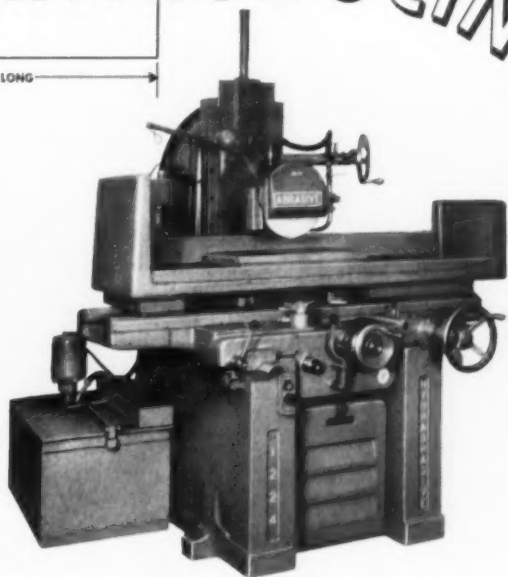


MACHINE TOOL DIV.

For more data circle 237 on Reader Service Card



INTRODUCING...



Famous Hydrabrasive quality, accuracy,
and performance in a new size . . . the
No. 1224 hydraulic-feed surface grinder.

**Get
Details,
Today!**

ABRASIVE

ACCURACY • RIGIDITY • PRODUCTIVITY

ABRASIVE MACHINE TOOL CO.
20 Dunellen Road East Providence 14, R. I.

Send Bulletin 1224 describing new 12" x 24" x 12"
Hydrabrasive Surface Grinder.

Name _____

Company _____

Address _____

For more data circle 238 on Reader Service Card



59 YEARS OLD — — and still threading **SKINNER** precision CHUCKS ***AUTOMATICALLY***

Machines have their story to tell. Like men, good machines never lose their precision. They simply get left in the lurch by progress.

New cutting steels, faster engines, quicker feed methods hasten retirement of older machines. For, what was high production in 1896, is but a trickle today.

In 1896 the SKINNER CHUCK COMPANY, of NEW BRITAIN, CONN. invested in their first COULTER to thread their famous line of scroll chucks. Today, SKINNER still depends on Coulters, because they perform *automatically*. The "grand-daddies" are put to part time work, so that SKINNER can devote its fast new Coulters to the job of high speed production.

Big Coulters — lathes with 4-speed headstocks, and return and idle speeds 5 *times cutting speeds*. Fast Coulters — threaders with starting and stopping levers within quick reach of the operator, and individual adjustments to both front and rear tool slides.

These hungry Coulters, and machines like them, often replace one, two — sometimes three — older machines. And — because of their advance design — they turn out four times the work at half the cost. Periodic retirement of older machines often spells the difference between a high and a low production figure. It does for SKINNER. Chances are it can for you.

Coulter's booklet "Automatic Threading Lathes" gives you a first-hand standard of comparison between new and old machines — and new and old production methods. A copy is yours for the asking.

MACHINE TOOL BUILDERS SINCE 1896

**James
Coulter**
Machine Co.

641 Railroad Ave.

Bridgeport 5, Conn.

For more data circle 239 on Reader Service Card

3

COMPLETE PRESSURE RANGES TO CHOOSE FROM!

See Danly's New Die Spring Line...



Medium Pressure

Medium-high Pressure

High Pressure

Now, you can design longer spring life into your dies. The new Danly Die Spring Line offers you 236 different springs to choose from—with the range of characteristics you've been looking for. Design of all springs in this new line is based on fatigue testing through millions of compressions at recommended loading and deflection.

Select the die springs you need from the new Danly line and get exactly the deflection, spring rate and size you want.



Send For New Catalog...

The new Danly Die Spring Catalog makes selection of the right die spring easier than ever before. Contains complete pressure and deflection data, as well as dimensions. Here are some of the unusual features of this catalog:

- **New Method of Selection**... new "step-by-step" selection method simplifies choosing the proper die springs to meet any given problem.
- **Simplified Charts**... the regular spring tables are read "straight across" and contain complete details to minimize confusing cross references.

Send for your FREE copy today.

Shown above is a spread from the new Danly Die Spring Catalog—detailing the simplified spring selection procedure worked out for you.



DIE SETS...
STANDARD OR SPECIAL
DIEMAKERS SUPPLIES

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 90, Illinois



"CAST OFF"

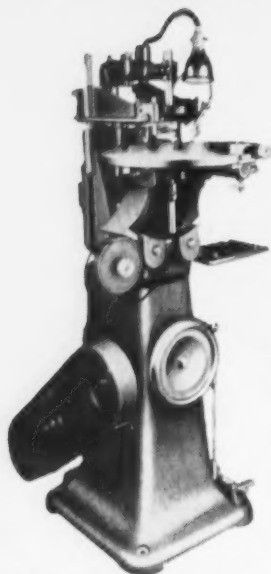
Waste and Inefficiency

ELIMINATE

INACCURACY EXCESSIVE COSTS

Equip
with

OLIVER DIE MAKING MACHINES



Loss of profits, directly caused by the waste and inefficiency of outmoded die making methods, will be virtually eliminated when you equip your toolroom with OLIVER DIE MAKING MACHINES. Proved daily in more than 10,000 installations around the world, the efficient Olivers consistently effect cost reductions as much as 60% through simplifying sawing, filing and lapping operations.

The economical OLIVER DIE MAKERS, engineered, designed and built by Oliver of Adrian, save you time . . . are easy to operate . . .

do not require skilled labor. These labor and time saving factors are important reasons why so many plants have been using Olivers for more than 30 years.

Unsurpassed for accuracy on Dies, Production Filing, Experimental Work, Metal Patterns, Cams, Gages and Templates, the precision-made OLIVER DIE MAKING MACHINES have been proved indispensable in maintaining production schedules . . . increasing output . . . and reducing high die making costs.

Be sure to see the Oliver Line — Booth 604 at The Machine Tool Show. —>

Oliver Die Makers available in 5 models —

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on
OLIVER DIE MAKERS

See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1430 E MAUMEE

ADRIAN, MICHIGAN

THE
MACHINE TOOL
SHOW

CHICAGO, ILL.
SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE

MACHINE TOOLS
by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

For more data circle 241 on Reader Service Card



Wilson "Rockwell"* Hardness Testers

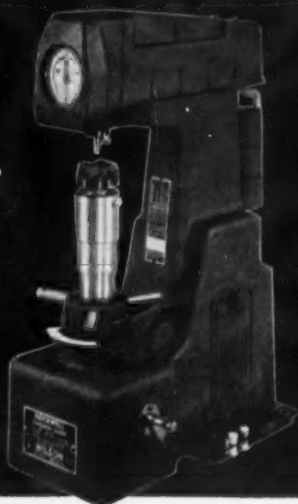
EASY TO USE
as a scale

SENSITIVE & ACCURATE
as a precision balance

DURABLE
as a machine tool

3-JR MODEL

*Invaluable for tool room use
and most production testing*



A FULL LINE TO MEET EVERY
HARDNESS TESTING REQUIREMENT

FULLY AUTOMATIC

•

SEMI-AUTOMATIC

•

SPECIAL

•

SUPERFICIAL

•

TUKON MICRO
AND MACRO
HARDNESS TESTERS

● WILSON "Rockwell" Hardness Testers were the first to combine the precision and sensitivity demanded in the metallurgical laboratory, the accuracy required in the tool room *plus* the ease of operation and durability for daily use on the production line.

A staff of WILSON hardness-testing experts is available to recommend just the size and model best suited for your job. Why not call or write today?

**Trade mark registered*

Visit Booth 116 • Production Engineering Show
Chicago—Sept. 6-16



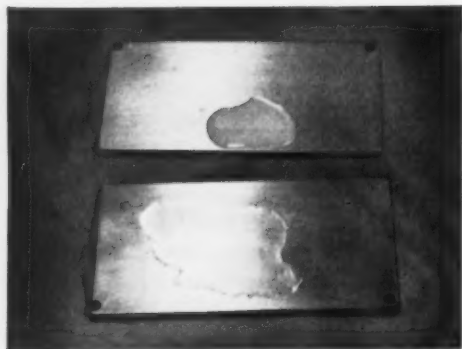
Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N. Y.

For more data circle 242 on Reader Service Card



Announcing **SHELL DROMUS OIL E**



Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.



Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water for six months without rusting.

SHELL DROMUS OIL E

NEW CUTTING OIL

*permits higher speeds
and faster feeds
than ever maintained before*

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50 %.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, including cast iron.

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation*. Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E, on any problem operation you have. It is that good!

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California



For more data circle 244 on Reader Service Card

Keep your eye on **Buckeye**

hand tool size

air tool power

these

NEW "L" SERIES

Reversible and Non-Reversible

SCREWDRIVERS and NUT RUNNERS

Less than 9 inches long . . . weighing well under 2 pounds . . . requiring only a limited air supply . . . these NEW Buckeye L Series screwdrivers and nutrunners are miniature in every respect—except power.

Into these pocket-size tools is packed all the quiet air power you'll ever need for any fastening job within tool capacity. You can choose adjustable or positive clutch . . . lever, lock button or offset handle . . . in 3,000 or 1,800 RPM speeds.

Designed and built for full-scale production use, Buckeye L Series tools make power tools practical for any fastening operation, even if you use them only intermittently. All the facts will be found in Catalog G-10—write NOW for your copy.



Buckeye Tools

CORPORATION

DIVISION 17 • DAYTON 1, OHIO

IN CANADA: Joy Manufacturing Co., Ltd., Galt, Ontario

producers of
the world's first
successful
rotary air tools

For more data circle 245 on Reader Service Card



There's a Standard **PUTNAM** **END MILL** *for Your Job!*

Universal Application of Putnam End Mills (there are over 1200 standard sizes and types) permits users to select a standard end mill specifically designed for each job.

Many standard Putnam End Mills are of a type considered "specials" by other manufacturers. Also, a wide range of sizes are available in every standard type of end mill to provide complete application coverage.

From smallest to largest sizes — from fine intricate machining to rugged milling operations there is probably a standard Putnam End Mill that will mill your job more efficiently. However, Putnam will also produce "special" end mills to your specs for those extra-special applications.



PUTNAM

TOOL COMPANY

2981 CHARLEVOIX AVENUE • DETROIT 7 MICHIGAN

For more data circle 246 on Reader Service Card

**BALANCED
TO HOLD A
KEENER
CUTTING
EDGE
LONGER**

du MONT TOOL BITS

**High Speed, Ground, Square
and Rectangular**

A precise balance of *wear resistance*, *toughness* and *red hardness* gives du Mont Tool Bits a definite edge in performance, gives you a real saving in cutting.

Make your own tests — compare cost and performance. You'll see why du Mont H. S. Tool Bits are favored by economy-minded buyers everywhere.

The du MONT CORPORATION,
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON
CHART, CATALOG and PRICE LIST
S to

Name

Company

Address

For more data circle 247 on Reader Service Card

Meetings

Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

September 6-17 • National Machine Tool Builders' Association, Machine Tool Show, International Amphitheatre, Chicago. Association headquarters: 2071 E. 102nd St., Cleveland 6, Ohio.

September 6-17 • Production Engineering Show, Navy Pier, Chicago. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

September 6-17 • Coliseum Machinery Show, Chicago Coliseum, Chicago. Information: Exhibition and Convention Management, Inc., 7335 Euclid Ave., Cleveland 3, O.

September 12-16 • Instrument Society of America, Tenth Annual Instrument Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles. Society headquarters: 1319 Allegheny Ave., Pittsburgh 13, Pennsylvania.

October 3-5 • National Electronics Conference, Inc., Eleventh Annual Conference, Hotel Sherman, Chicago. Organization headquarters: 84 E. Randolph St., Chicago 1, Illinois.

October 10-12 • American Society of Mechanical Engineers and American Society of Lubrication Engineers, Second Joint Lubrication Conference, Antlers Hotel, Indianapolis, Ind. Information: D. F. Wilcock, General Electric Co., 1 River Rd., Schenectady, New York.

Extras



...are standard equipment at AMERICAN



- * Double ground lead for easy pressing into the jig.
- * Radius into the hole - to prevent tool hang-up, wear and breakage.
- * Two way undercut under the head to insure squareness to the jig.
- * 100% concentricity inspection.
- * Internal ground holes to insure straightness.
- * Original 3-D ordering method eliminating confusing code numbers.
- * Patented bushings for plastic tooling.
- * Complete local stocks.

**USE AMERICAN-PIONEERS IN PRODUCING DRILL JIG BUSHINGS
WITH EXTRA FEATURES AS STANDARD EQUIPMENT.**



Send today for
the newest free
Catalogs showing
complete line.

American

DRILL BUSHING CO.
5107 PACIFIC BOULEVARD
LOS ANGELES 58, CALIFORNIA

For more data circle 248 on Reader Service Card

Tools – and operators – keep their tempers with Norton wheels

Only Norton builds these value-adding, time-saving "TOUCH of GOLD" features into wheels for tool room grinding



All teeth stay the same height when you sharpen milling cutters with long wearing, free cutting Norton G Bond wheels that hold size all the way round. The machine is a Norton No. 20 Cutter and Tool Grinder.

NORTON GENERAL PURPOSE WHEELS

Out-of-the-ordinary wheels for your ordinary bench or floor stand grinding. Available in the abrasive-and-bond combinations you need for economical, trouble-free performance. Chances are that any tool wheel or general purpose wheel you require is carried in stock.



Exclusive precision processing gives Norton tool room grinding wheels unusual advantages, including controlled uniformity and built-in balance, that reduce vibration and assure smoother running wheels.

Plus The Famous G Bond

Also, you can get these wheels in the most efficient vitrified bond ever produced — the Norton G Bond, developed especially for precision-grinding the hardest tool steels. G Bond wheels: *cut freer, cooler, faster . . . do more work per wheel . . . hold corners better, are better for form grinding, dress easier and grind more pieces per dressing.*

And for rapid stock removal, with especially cool cutting action, Norton 32 ALUNDUM* abrasive is outstandingly popular. All G Bond wheels reduce tool spoilage, give you closer tolerances and smoother finishes, with fewer wheel changes and machine adjustments — additional "Touch of Gold" benefits that mean better performing tools and better, lower-cost tool room grinding.

For Your Carbide Grinding

Norton diamond wheels, carbide grinding's recognized "Crown Jewels", are made in all required bond types. Their accurate cutting action and extra long service life bring you top savings in every single point and multi-tooth carbide grinding application. Also available are CRYSTOLON* wheels green or gray — with the cost-cutting K Bond.

See Your Norton Distributor

Or write direct. And remember: only Norton brings you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1661



*Making better products . . .
to make your products better*

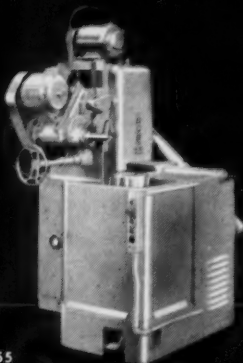
and Its BEHR-MANNING Division

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

For more data circle 25J on Reader Service Card

Greater Flexibility with Cross Gear Machines

for rounding • chamfering • pointing • burring

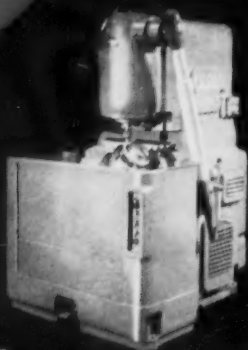


NO. 55

For rounding, pointing, chamfering or burring external and internal—

spur gears • helical gears
clutches • splines

Typical production—rounding or pointing
8 pitch 30 tooth gears—55 net hourly

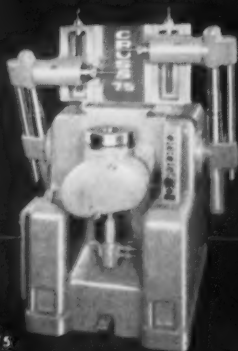


NO. 65

For pointing or chamfering external and internal—

clutches • spur gears
bevel gears • splines

Typical production—pointing 10 pitch 30
tooth gears—100 net hourly.



NO. 75

For burring or chamfering both ends at the same time—

helical gears • spiral bevel pinions
hypoid pinions

Typical production—chamfering 8 pitch 40
tooth gears—200 net hourly.

- * Flexibility for handling a wide variety of gears.
- * Rugged, heavy duty construction for continuous high production or job shop operation.
- * Short setup time (as little as 15 minutes) for changing from one gear to another.
- * Simple, inexpensive tooling.
- * Push button controlled automatic cycle.
- * Hydraulic power work clamping.

For mass production or short run jobbing operations, there is a Cross Gear Machine to suit your requirements.

Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

modern machine shop

ADVERTISING REPRESENTATIVES

Granville M. Fillmore, Vice President, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

Duncan W. Barton, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

George E. Hay, 431 Main Street, Cincinnati 2, Ohio, MAin 1-0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

John M. Krings, Vice President, Tribune Tower, Chicago 11, Illinois, DElaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, MAin 1-0182. Central Indiana.

Gene J. Schwarber, Advertising Manager, 431 Main Street, Cincinnati 2, Ohio, MAin 1-0182. Eastern Michigan, Missouri, Kansas.

The Robert W. Walker Company, 2330 West Third St., Los Angeles 5, Calif., DUNKirk 7-4388; 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★

modern machine shop
431 Main St. Cincinnati 2, Ohio

August, 1955

**PERFECT ALIGNMENT
EVERY TIME with
ROOFE Heavy Duty
BULL NOSE CENTERS**



Two double rows of quality bearings in the large and small ends of the nose of this live center are your assurance of perfect alignment on any type of work.

Two shank sizes provide diameters from 1/2" to 7 1/2" for a wide range of work with a single center.

Write now for complete catalog of all types of ROOFE Live Centers.

**HOUSTON GRINDING
and MFG. CO.**

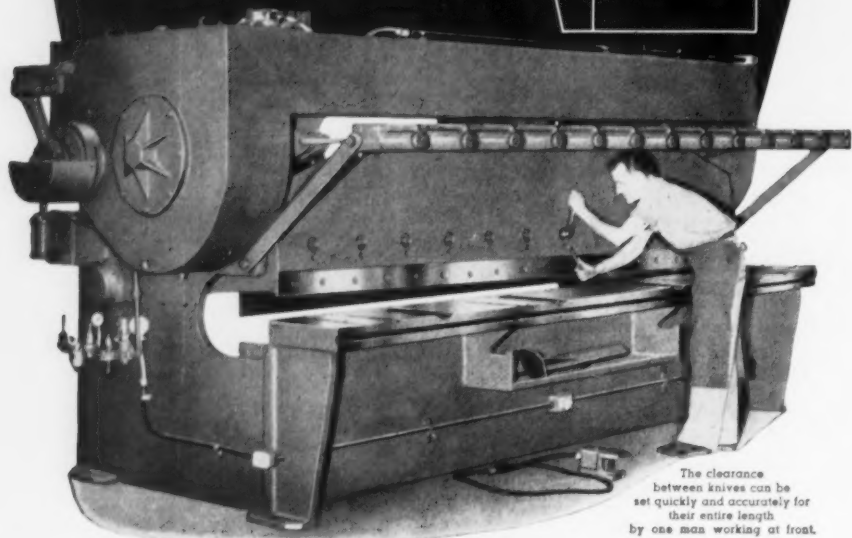
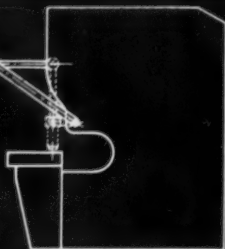
2110 QUITMAN HOUSTON 10, TEXAS

For more data circle 252 on Reader Service Card

modern machine shop 53

Knife Adjustment...

Easy and Convenient on
STEELWELD SHEARS



The clearance between knives can be set quickly and accurately for their entire length by one man working at front.

When the knives on a Steelweld Shear are being set parallel from one end to the other, it is not necessary to have one man at the rear of the machine turning adjustment bolts, with another man at the front gauging the knife clearance. Nor is it necessary to work between or behind the hold-downs in hard-to-reach places.

On Steelwelds the hold-down beam can be lifted out of the way and all knife adjustment bolts reached from the front of the machine. As each bolt is turned, the clearance can be checked

at once. One man can make the entire adjustment in a small fraction of the time usually required.

After the knives have been set for parallel, the clearance between them can be adjusted to suit various plate thicknesses to obtain the best possible cuts. This can be done in a few seconds by turning a crank and watching a dial indicator.

Because knife adjustments have been made so convenient on Steelwelds, shear operators will make them gladly and without hesitation. This contributes greatly to accuracy and quality of cuts and assures long knife life.



GET THIS BOOK!

CATALOG, No. 50 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
6438 EAST 163RD ST. WICKLIFFE, OHIO.

STEELWELD PIVOTED BLADE SHEARS

For more data circle 253 on Reader Service Card

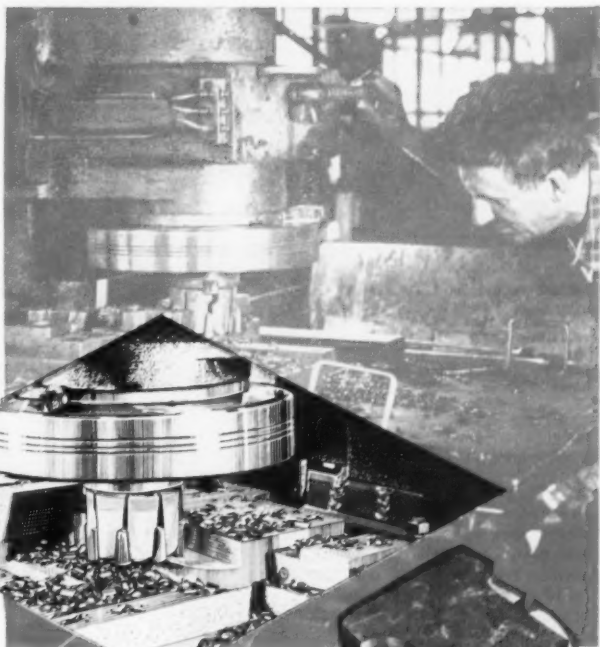
OK

carbide end mill hogs out tough, torchcut 1020-30 boilerplate for Producto Die Sets

A fine example of heavy milling is this bolt seat for Producto die set clamp pads. Milled sections up to $1\frac{1}{4}$ " depth and 3" width are cut at the high rate of 7 to 10" per minute.

With one pass of the tool, an OK carbide end mill, mounted on a specially built Producto clamp pad miller, and driven by a 30 hp motor, removes slabs of metal weighing 10 lbs. from each side in less time than it takes to read these lines. This is a tough metal cutting job because hard edges caused by flame cutting are not appreciably softened during the annealing process which precedes milling.

At Producto Machine Company, Bridgeport, milling cutters for cutting steel are painted RED. Carbide cutters for milling semi-steel are painted ORANGE. This color distinction reduces errors in the tool room and is highly recommended.



JOB DATA

WORKPIECE — Clamp pad for well-known Producto die set.

STEEL — Annealed flame-cut 1020-30 boiler plate with hard-spot edges caused by terrific heat from the torch.

MACHINE — A special clamp pad miller built in Producto's own shop powered with a 30 hp motor.

CUTTER — A 5-8-blade OK carbide end mill, the only mill found capable of handling this tough job.

RESECTION — A piece irregular in shape varying from 10 to 15" in length, 2-3" in width and up to $1\frac{1}{4}$ " in depth.

FEED — 7 to 10" per minute.

Write for OK Tool Catalogs

TWO COMPONENTS—
BODY AND
BLADES



OK

modern milling cutters
for modern milling machines

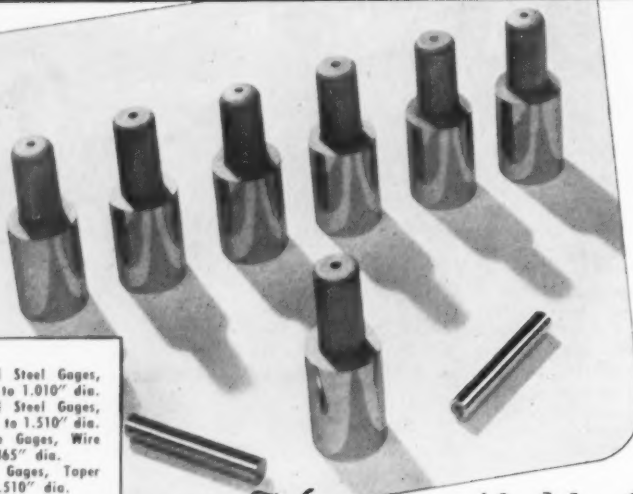
THE OK TOOL CO., INC., Milford, New Hampshire

For more data circle 254 on Reader Service Card



PLAIN PLUG GAGES *class XXX !!*

Chromium Plated Steel Gages,
Wire Type .010" to 1.010" dia.
Chromium Plated Steel Gages,
Taper Lock .010" to 1.510" dia.
Tungsten Carbide Gages, Wire
Type .010" to .365" dia.
Chrome Carbide Gages, Taper
Lock .365" to 1.510" dia.



*Now available for
fine inspection requirements*

In response to persistent demand, VK has developed and now announces a new, ultra-fine, plain plug gage tolerance of .00001", designated as Class XXX. This new tolerance, half of that of Class XX, satisfies a need, long evident, for gages to meet part limits finer than .0002", and permitting only ten millionths of an inch total variation on the gage in sizes up to .825" diameter, and only fifteen millionths in sizes from .825" to 1.510" diameter. Tolerance may be applied either bilaterally or unilaterally. Inasmuch as Class XXX tolerance must take into account such factors as finer diameter variation, a high order of roundness control, an

exceptional surface finish and an extreme resistance to wear (all of which offset the shallow wear depth inherent in such a gage class), Class XXX is offered in only Chromium Plated and Carbide Gages.

VK Class XXX Plain Plug Gages are furnished in the materials, styles and ranges shown in boxed panel above. VK also furnishes Class XX, X, Y, and Z standard tolerance plug gages in wire type, taper lock and trilock designs. For complete information address: The Van Keuren Company, 175 Waltham St., Watertown, Mass.

"Quality in Millionths"



THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Cemented Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages



For more data circle 255 on Reader Service Card

*If you're eating your heart out
over polishing costs---read this!*



Skyrocketing enthusiasm of America's homeowners for high-quality solid-brass lighting fixtures created a temporary bottleneck in the polishing room of Globe Lighting Products, Inc., one of the leaders in the field. This production problem coincided with the introduction of Formbrite® to the metal-working industry a couple of years ago.

Globe's acceptance of this easy-to-polish fine-grain drawing brass was immediate and enthusiastic. Results were highly successful from the very beginning. Work pile-ups in the polishing room were eliminated and polishing costs were cut in half on many items (see typical examples below). In addition, Globe learned, as have many others, that Formbrite provides a more lustrous finish—is harder, stronger, springier and more scratch-resistant, yet has remarkable ductility for forming and drawing operations.

Surprisingly, Formbrite doesn't cost a penny more than ordinary drawing brass. Why not pass the good news along to those who head up your engineering, design or production departments? Ask them to write for booklet B-39 . . . or phone for a sales representative . . . or request a free sample of Formbrite to try in your own shop. Address: The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

5580

*Reg. U. S. Pat. Off.

Parts illustrated are approximately one-half actual size.

48% saving

5/16 x .062" round-edge Formbrite strip in this scroll eliminated a before-bending polishing operation.

45% saving

After forming, this Formbrite channel edging is simply bright dipped, color buffed, degreased, lacquered. That's all!

55%

saving This hard-to-handle ornamental banding now gets only a simple color buff, saving as much as the cost of the metal.

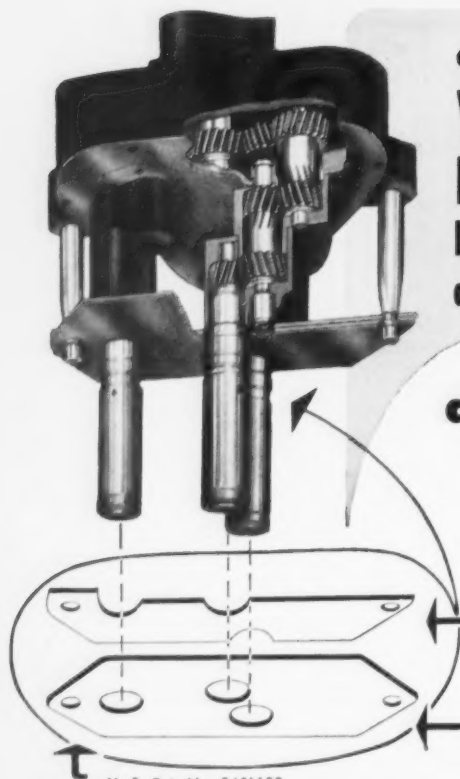
26%

saving Tens of thousands of these drawn canopies, socket cups, etc., have been made of time-and-cost saving Formbrite.

Formbrite

FINE-GRAIN DRAWING BRASS
an ANACONDA product

made by The American Brass Company



only
WISCONSIN
DRILL HEADS
 have both Locating
 and Locking Templates

an *Exclusive*
Patented
Feature

1 Locating Template

Each spindle swings into half-holes of locating template for fast, accurate positioning.

2 Locking Template

Full-hole template fits over spindles, locking them into exact position.

U. S. Pat. No. 2451123

Other Wisconsin Drill Head Features

WIDE RANGE—Each spindle has 3 centers to provide maximum range of bolt circle adjustments. U. S. Pat. No 2441722.

LONG LIFE—Helical gears and other moving parts are hardened to resist wear.

STANDARD PARTS — Replacement parts for all standard models always in stock.

SIZE AND CAPACITY—There are 6 models of Wisconsin Adjustable, Multiple Drill Heads, each in 2 to 8 spindles. Capacity: Wire Size thru 1½" dia. Operating Speeds to 4000 r.p.m.

In addition to Standard Multiple Adjustable Center Drill Heads, Wisconsin builds Special Fixed Center Drill Heads, Lead-Screw Tapping Units, Fixture Bases, Special Machines — both Index and Transfer Type.

Write for Name of Nearest Representative



WISCONSIN DRILL HEAD CO.

4983 N. 124th STREET • BUTLER, WISCONSIN

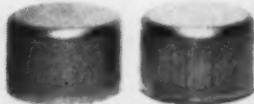
For more data circle 257 on Reader Service Card

7 benefits received by switch to **STANOSTAMP Compound C**

Jagemann Stamping Company, Manitowoc, Wisconsin, benefited seven ways by switching to STANOSTAMP Compound C. Finished ferrules drawn from 19 gauge cold roll steel were being badly scored. At the same time dies were being scratched and excessive heat experienced in the press. Standard lubrication specialist R.E.O'Brien suggested STANOSTAMP. The result:

1. Production increased 20%
2. Die maintenance reduced 30%
3. Spoilage reduced
4. Finish improved
5. Galling minimized
6. Cooler machine operation
7. Washability improved

STANOSTAMP Compound C is a water emulsifiable paste for heavy drawing operations. It contains an inert, non-abrasive mineral filler for protection of dies and work, is readily cleaned from work in conventional washing equipment. In the Midwest, your nearby Standard Oil lubrication specialist will be glad to tell you more about STANOSTAMP. Call him. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Air hose ferrules. One at right produced before switch to STANOSTAMP, one at left produced after conversion to this forming compound. Scoring of dies as well as work occurred before switch.

Father and son inspect ferrules. William P. Jagemann (left), President, and son William T. Jagemann note improved finish on work using STANOSTAMP.

STANDARD OIL COMPANY
(Indiana)



NO down



*Photos courtesy Century Machine Company,
4434 Marlburg Avenue, Cincinnati 9, Ohio*

time in **16** years...

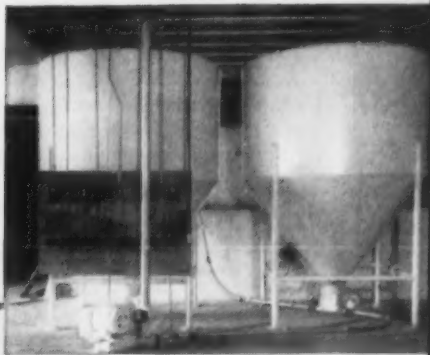


SEE
CINCINNATI
SHAPERS, SHEARS,
PRESS BRAKES
BOOTH 1105

The records of the Century Machine Company show "no down time in sixteen years use" on this Cincinnati Press Brake.

This machine, working a 9½ hour day, forms light gauge sheets in mild and stainless steel up to ¼" thickness. It is constantly producing accurate parts for easy assembly of Century's baking ovens and bakery machinery.

Write for New Press Brake Catalog B-4 describing Cincinnati Interlocking All-Steel construction, Center-line Loading, deep rigid beds and rams.



● Flour Storage Bins—each 1000 lbs. capacity

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



Olympic FM

DIE STEEL . . . used on

Roto-Flo Spline Rollers

SAE 1040 splines being cold formed.

Photo courtesy Michigan Tool Co.

**Michigan Tool Co.,
Detroit, selected**

Olympic FM for this severe cold forming application

On the new Roto-Flo Spline Rollers manufactured by the Michigan Tool Company, Latrobe's Olympic FM Die Steel has been specified for use in the cold forming racks shown above. This is a severe application involving heavy pressure to cold-form steel splines, serrations and similar shapes . . . an application that demands up to 150,000 production pieces before the racks are removed for regrounding.

Olympic FM . . . one of Latrobe's new free-machining high carbon-high chromium die steels . . . has proved extremely successful on long production runs of all types of tools and dies. In addition to long performance characteristics, Olympic FM yields a superior machined finish and easier machinability . . . factors resulting from the addition of alloy sulphides uniformly dispersed by the DESEGATIZED® process of manufacture.

For improved machinability and long production runs, order Olympic FM . . . over 250 sizes are stocked in ten conveniently located warehouses. Your order will be handled promptly and courteously.

For more data circle 261 on Reader Service Card

**BE SURE TO SEE THE
ROTO-FLO IN ACTION!**

MACHINE TOOL SHOW

Chicago—Sept. 6 thru 17th

**LATROBE
STEEL COMPANY**

Main Office and plant

• LATROBE, PENNSYLVANIA

Branch Offices and Warehouses in principal cities

Automation

Here are pictured just two Lapeer AIR-OPERATED Clamps—of many models available to assist in achieving AUTOMATION in your plant!

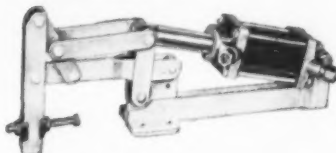
There are models for 200 lbs. . . . 400 lbs. . . . and 1200 lbs. clamping force!

And if it's HEAVY-DUTY type you need, we have those too!

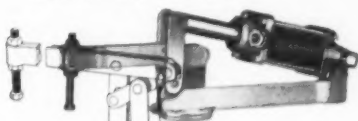
See all of these at our EXHIBIT 510, PRODUCTION ENGINEERING SHOW at Chicago in September . . . and at our BOOTH #706, METAL SHOW at Philadelphia in October.

AND LAPEER AIR-OPERATED CLAMPS

MODEL AODT-400



Double-toggle clamp
to clamp "around the corner"



MODEL AO-400

Toggle Clamp for conventional clamping. Superimposed line drawing illustrates the AODT-400 for such difficult mounting situations as when the cylinder interferes with conventional clamping.

4710

SEND FOR
OUR CATALOG
NOW!



Manufacturers of a complete line of Stationary and Portable Clamps and Pliers

**KNU-VISE
PRODUCTS**

LAPEER MANUFACTURING CO.

3048 DAVISON ROAD

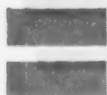
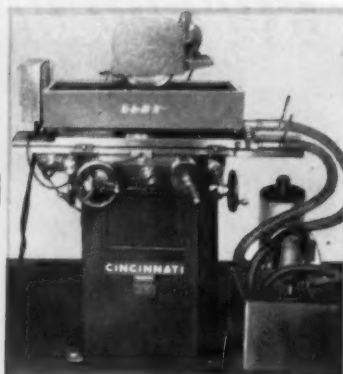
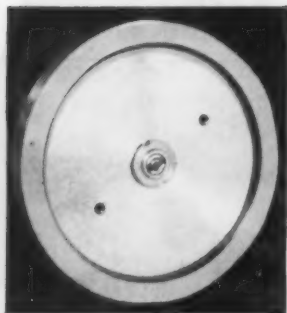
WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

LAPEER, MICHIGAN

For more data circle 262 on Reader Service Card

August, 1955

modern machine shop 63



100% more pieces per grind
300% less tools required per job
400% savings in monthly tool cost

the superiority of
ELOX electrical
 discharge
 grinding was
 proved by this
 large automotive
 company's**
 unsolicited 2-month
 comparison report!

Tool Name, Description:	Solid Carbide Insert	
Part Name:	Crankshaft	
Operation Name:	Finish Front & Rear Thrust Bearings	
	Standard Grind	Elox EDM Grind
TOTAL PIECES PER TOOL	17,290	95,904
MINUTES PER GRIND	21.0	13.75
COST PER GRIND	\$ 1.26	\$.83
ESTIMATED MONTHLY TOOL COST	\$294.71	\$92.19

in writing

Elox will guarantee increased tool productivity over any type of abrasive grinding.

Other Elox equipment available to remove broken taps, drills, etc., from \$495 to \$3450.

elox corporation of michigan

**Comprehensive report and company name given on request.
 *T. M. Reg.

For more data circle 263 on Reader Service Card

There's an **IDEAL**
LIVE CENTER
 to do YOUR job best!

**STANDARD MODELS IN A COMPLETE
 LINE DELIVERED FROM
 DISTRIBUTORS STOCKS!**

When you choose IDEAL Live Centers you seldom have to resort to "specials" and the slow delivery and inventory problems they involve. You can handle practically any turning job with a *standard* IDEAL Live Center.

Top performance is also "standard" with IDEAL Live Centers. They have proven their accuracy and long life in tough service in shops all over the country where they are first choice! When you need a live center, you'll get the one you want, when you want it, easiest, from the complete IDEAL Line, stocked by your IDEAL Distributor.



UNIVERSAL

Accuracy to plus or minus .0001". Unusually high load capacity up to 5200 lbs. at 50 RPM. Morse tapers 2, 3, 4 and 5.*

***IDEAL LIVE CENTERS ARE ALSO
 AVAILABLE IN BROWN &
 SHARPE AND JARNO TAPERS**

Sold through Leading Distributors
 In Canada: Irving Smith, Ltd., Montreal



MULTI-DUTY

Interchangeable male, female and pipe points for centered and un-centered work. Nine sizes: Morse tapers 1 through 5, as well as straight.* Loads to 1500 lbs. at 100 RPM.



HEAVY DUTY

For close tolerance turning jobs to 22,000 lbs. at 50 RPM. Eccentricity less than .0002". Morse tapers 4, 5, 6 and 7.*



NEW

**PIPE POINT
 LIVE CENTER**

For heavy turning work on pipes and other large, hollow cylinders. Sizes range from 3" diam. to 7 1/2" diam. Load capacities up to 22,000 lbs. Morse tapers 3, 4, 5, 6 and 7.*

IDEAL INDUSTRIES, Inc.

1031 Park Avenue, Sycamore, Illinois

Please send free catalog data on IDEAL Live Centers

NAME.....

COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....



For more data circle 254 on Reader Service Card



the class leader
...and with high speed steels
REX is first in its class

Outstanding achievement! That's the only way a product can earn the reputation of being "first in its class." And REX®, as the recognized leader in high speed steels, is no exception.

In thousands of tool shops... in every type of application — Crucible REX high speed steels have proved their superiority for over half a century. But it's performance in *your* shop that counts! Try REX on your next job. Test it for size, structure, response to heat treatment, fine tool performance. And you, too, will say REX is first in its class.

REX is made only by Crucible. It's available immediately from local Crucible warehouses... or by prompt mill delivery. To find out about REX and the many other types of Crucible special purpose steels, write today for "Crucible Publication Catalog," Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

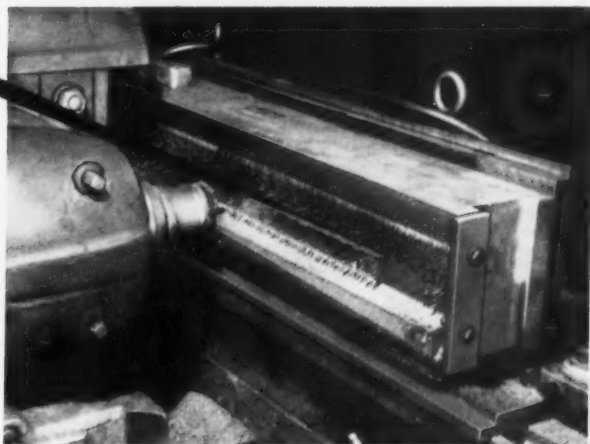
CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

For more data circle 265 on Reader Service Card

**Hanchett
Magna-Lock
Magnetic Chuck
at Turchan
Follower
Machine Co.**



REDUCES SETUP TIME 66.6%

THE JOB: Milling hard cast iron gibs, $1\frac{3}{8}$ " maximum width, variable lengths, 60° compound angle, .250" taper per foot. Roughing cut: $1\frac{3}{8}$ " max. width, 0.200" depth. Finishing cut: $1\frac{3}{8}$ " max. width, 0.050" depth. Spindle speed: 385 RPM. Cutter: 8-flute carbide tip 3" dia. Table speed: 15 IPM—20 IPM. Stock removal: Approximately 4 cu. in. per min. Fixture: mechanical.

THE PROBLEM:

1. Fixture setup time and handling was 60 minutes plus time required to layout, drill and tap holes in the gibs to coincide precisely with the bolts of the fixture. Spacing varied between 9" and 10" at several intermediate increments.
2. The holes were not functional parts of the gibs, being used only to hold the gibs while being milled.
3. Because of the several milling operations, the gib had to be removed each time and re-bolted to the fixture.

THE SOLUTION: A Hanchett MAGNA-LOCK Magnetic Rectangular CHUCK positioned on a sine bar, the milling machine cutter spindle being swiveled to the corresponding angles.

THE RESULT:

1. FIXTURE SETUP AND HANDLING TIME—20 MINUTES.
2. Layout, drilling and tapping operations eliminated.
3. Time required to re-bolt gibs on fixture for each operation eliminated.

You, too, can increase your machines' productivity with Hanchett Magna-Lock Magnetic Chucks and Devices. Take advantage of Magna-Lock's experience and engineering know-how—at your service to help solve your holding problems. Magna-Lock is the only *exclusive* manufacturer of magnetic chucks and devices.

WRITE TODAY, Dept. MM-85.

Request Magna-Lock as original equipment on your new machines.



Hanchett MAGNA-LOCK CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS, MICHIGAN, U.S.A.

For more data circle 266 on Reader Service Card



THIS ONE WAS EASY . . .

A Nilson 4-Slide, Number 1, forms 150 drapery hooks per minute from 0.70 basic steel wire. Nilson 4-Slides form wire or ribbon stock from the coil. They straighten, feed, pierce, blank, swage, stamp or coin, cut and form in one, fast, automatic operation . . . accommodate wire up to .5" dia., in feeds to 32" max., and ribbon up to 3.5" wide. Press sections from 5 to 75 tons. Send for catalog.

NILSON 4-SLIDE TAKES A TOUGH ONE

Mass production of body trim clips for a leading make automobile proved a complex forming problem. A. H. Nilson's 4-Slide (Model S-4-T) did the job, forming .025" x 3", 1065 C.R.A. steel at 54 strokes per minute! Accurate, fast, and automatic, Nilson 4-Slides keep pace with one of the nation's biggest industries.



1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines : Staple Forming Machines : Wire Straightening Equipment
Wire and Stock Reels : Slide Feeds for Presses : Wire & Ribbon Stock Forming Machines

For more data circle 267 on Reader Service Card

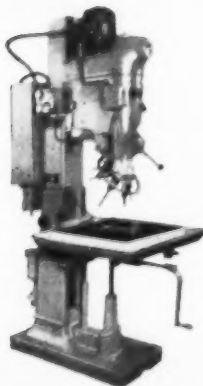


ways to cut costs of drilling and tapping

The H&F turret drilling machine, with preset depths, speeds and reversals—all attention-free during successive operating cycles—offers dramatic savings in:

1. Handling time.
2. Set-up time.
3. Tooling.
4. Maintenance.
5. Capital investment.
6. Floor space.

H&F Time Study #10 proves this versatile machine cuts handling time from 24% to 67%, assuming conditions most favorable to competitive equipment. Write for H&F Time Study #10 and new bulletins.



hf
HOWE & FANT

H&F's time saving turret attachment is separately available for attachment to standard drill presses . . . preset depth, speeds and reversals not included.

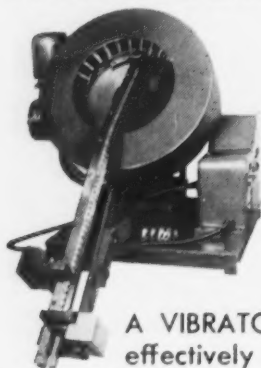
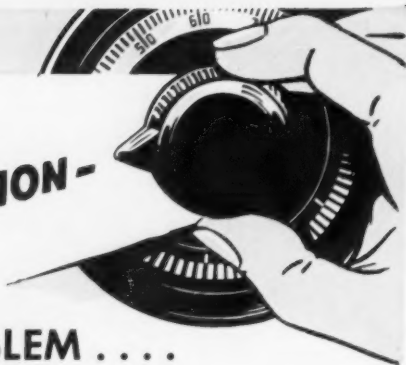
29 FITCH STREET, EAST NORWALK, CONN.

For more data circle 268 on Reader Service Card

The RIGHT COMBINATION -

for Your

PARTS FEEDING PROBLEM . . .

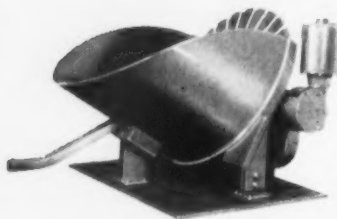
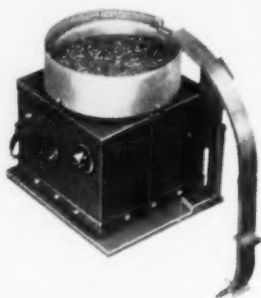


DPS BARREL FEEDER

A Time-Tested Device for use on parts requiring critical selection.

DPS BOWL FEEDER

A VIBRATORY Feeding Device to effectively select and feed parts that could not normally withstand tumbling.



DPS BARREL FEEDER

with STATIONARY RING COVER operating on Rotary Principle, but providing 3 TIMES THE LOAD CAPACITY of other feeders. Designed for heavy-duty large production runs.

**GIVE US YOUR PROBLEM
GET THE FACTS!**

Send for Up-to-Date
Catalog TODAY!

DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST.

DETROIT 16, MICH.

For more data circle 269 on Reader Service Card



JUST AS A NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a

A manufacturing achievement
that will save you money and
increase your production . . .



POSITIVE DUPLICATION of an original grinding wheel every time through the CINCINNATI (PD) Manufacturing Process.

NOW! Cincinnati Grinding Wheels

offer



POSITIVE DUPLICATION

It's the greatest grinding wheel development in years! For through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel every time you reorder.

"On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike. Yet they are priced no higher than ordinary wheels.

Let us prove to you how CINCINNATI (PD) WHEELS can save you money and increase your production. Just contact us and we'll send one of our representatives—

men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

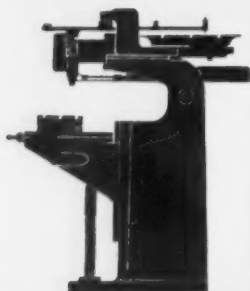
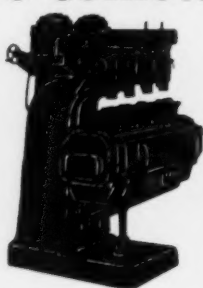
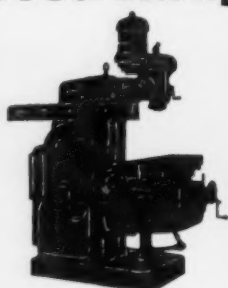
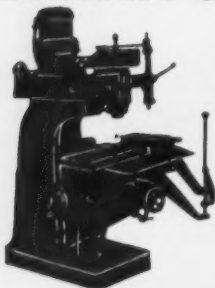


For more data circle 270 on Reader Service Card

August, 1955

modern machine shop 71

Shadows of Good Things to Come...



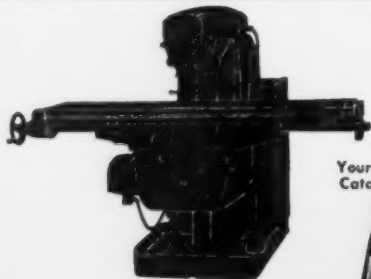
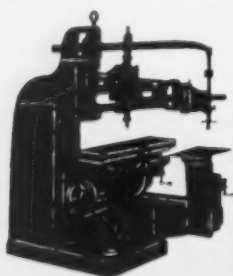
The "good things" are production speed-ups and cost cuts . . . yours with new Gorton machines. Come to Gorton's booth and see 17 machines operating under production load — many brand new and never before exhibited; some completely redesigned; others with typical Gorton improvements.

Included . . .

Gorton No. 2 Horizontal with Receptor Ram and Super-Speed Universal head and ram assembly. Don't miss the *Economy Model* — No. 3 Horizontal with 76" table and 48" table travel.

VISIT GORTON'S Booth No. 1019 (Ground floor, south end of South Hall)

The latest in Tracer Control — manual, semi-automatic and completely automatic within the cutting cycle. Spindle speeds up to 48,000 rpm; hp as required.



Yours on request —
Catalog 1655-1708



GEORGE GORTON MACHINE CO.

1708 RACINE ST.


RACINE, WISCONSIN, U. S. A.

SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 271 on Reader Service Card

A 8479



IF YOU ARE A MAN THAT
WORKS THE ANGLES . . .
HERE'S A NEW SLANT ON
FAST ANGULAR SET-UPS
THE **MAGNA-SINE**

OMER E. *Robbins* CO.

24808 PLYMOUTH RD.



DETROIT 39, MICH.

ALSO PRODUCERS OF SPECIAL MACHINERY, GAUGES AND FIXTURES

Comparison proves:

new IMPERIAL has:

Swing over ways

Swing over gap

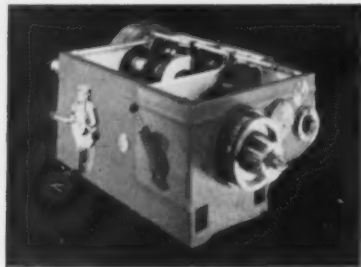
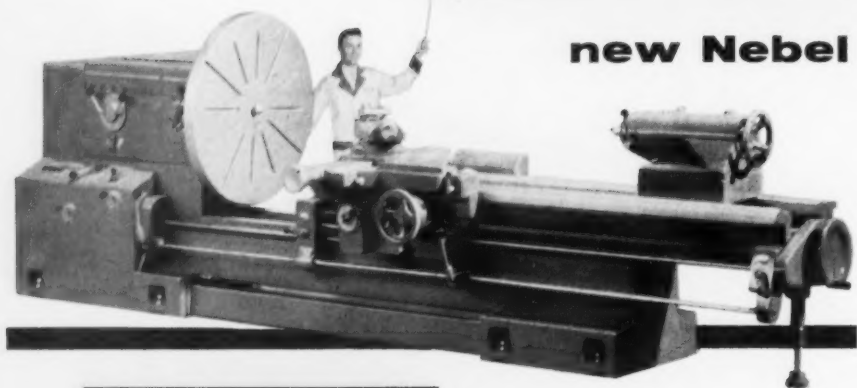
Spindle speeds, number

Spindle speeds, range, rpm

Main drive motor, hp

Weight, net, lbs.

new Nebel



IMPERIAL HEADSTOCK—powerful
18-speed dynamo of metal-cutting energy

Smartly engineered, perfectly balanced, the Imperial headstock delivers more power to the spindle. Husky shaved and hardened steel gears are mounted on short, spined shafts. All shafts run on anti-friction bearings including the 3-bearing spindle. An oil spray, automatically controlled, provides ample lubrication.

The Imperial offers 18 spindle speeds with a single speed motor, ranging from 11 to 666 rpm, or from 16 to 1000 rpm. With a 2-speed motor, 36 spindle speeds are available, ranging from 5 to 666 rpm, or from 8 to 1000 rpm.

plenty of **CAPACITY - POWER - SPEED - Costs less**

Imperial	Lathe Z
24½"	20½"
42"	41½"
18 (36 with 2-speed motor)	24
11-666	11-673
10-20	10-15
8100	8200

IMPERIAL biggest value in extension bed gap lathes

Before you buy your next extension bed gap lathe, check the new Nebel 20"/40" Imperial. Compare it with any other lathe of its kind. You'll find:

(1) The new Imperial costs less—several hundred dollars less—than its nearest competitor, yet has fully as much capacity, power and weight.

(2) Imperial offers a new experience in operating ease, efficiency and economy.

For complete information on the first really all new extension bed gap lathe introduced in the last 10 years, write today for descriptive free bulletin, Nebel Machine Tool Corp., Cincinnati 25, Ohio, U. S. A.



SEE THE NEW IMPERIAL AT THE SHOW!

Be sure to see the new Imperial—and other Nebel gap and engine lathes—in action in Nebel booth 511 at the Machine Tool Show, International Amphitheatre, Chicago, September 8-12.



For more data circle 274 on Reader Service Card

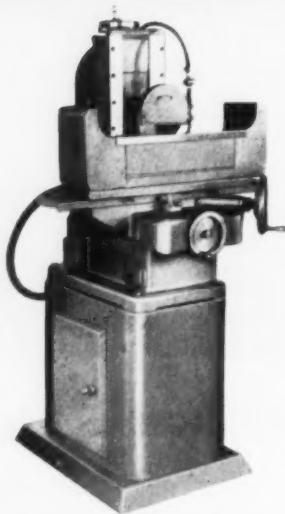
You Save when you buy them —
when you use them —



EXCEL No. 6

CUTTER and TOOL GRINDER

Low first cost plus savings in sharpening reamers, milling cutters, C bores and other tools make the Excel No. 6 a first-rate investment. With attachments, the No. 6 does internal and external grinding, too. Swings work 8" x 16". Get the details about the quality-packed Excel No. 6. Send for Bulletin M685.



EXCEL No. 7

HAND FEED SURFACE GRINDER

A low-cost precision machine that saves money on those small production runs and in the tool room. Grinds tools, dies, chip breakers, thread chasers accurately and fast. You'll find the rugged, easy to operate, easy to maintain Excel No. 7 a real asset to your plant. For details, send for Bulletin M785.

EXCEL PRECISION GRINDERS

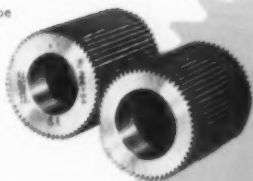
BENTON HARBOR
MICHIGAN

HYDRAULIC & HAND FEED SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDERS

For more data circle 275 on Reader Service Card

Money-Saving Slant on Special Cutters... from Brown & Sharpe

Matched pair of opposed profile-sharpened cutters engineered by Brown & Sharpe to finish-mill steel wire into high precision hosey needle blanks at a single synchronized pass.



Form-relieved cutter, 9 1/2" diam. — one of many individually designed to mill turbine blades within 0.0005" accuracy.



You can *always* save money by letting us handle unusual cutter jobs from design to finished cutters. Reasons? Cutter designers who are *specialists* . . . complete facilities for manufacture and heat treating . . . unmatched experience that covers the widest variety of milling problems. Results? . . . Typical cases

are illustrated on this page.

Cutters with plenty of "guts" . . . producing parts at lowest cost per piece . . . with highest sustained accuracy. What's *your* special cutter problem? Brown & Sharpe Mfg. Co., Providence 1, R.I., U.S.A.

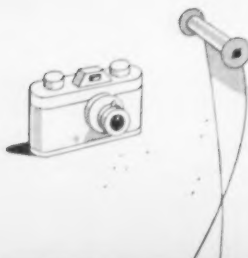
*Buy Through Your
Local Distributor*

Brown & Sharpe

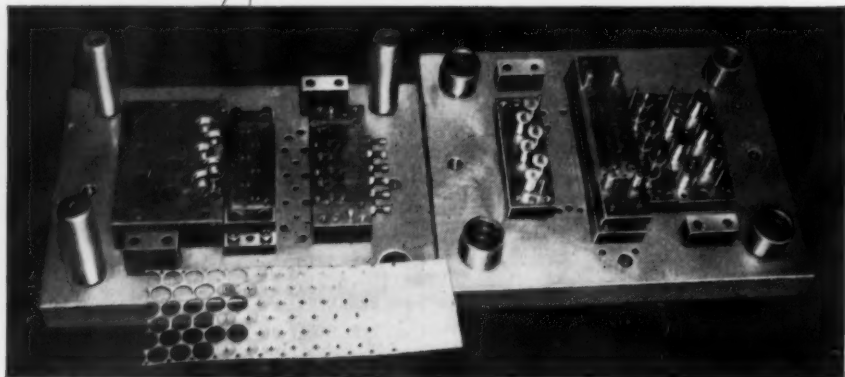


VISIT BOOTH 536 at the MACHINE TOOL SHOW

For more data circle 276 on Reader Service Card



Over 150 Million Stampings from this **ONTARIO** Die



600,000 Film Spool Flanges PIERCED, EMBOSSED, STAMPED and BLANKED per Grind

Production engineers at an eastern camera manufacturing plant have reported excellent results from their Ludlum Ontario film-spool-flange die. The Ontario die performs the multiple operations of piercing, embossing, stamping, and blanking.

Operating at 130 strokes a minute, the big die has produced over 150,000,000 parts. Runs as high as 600,000 have been made between grinds. For this operation, Ontario is air cooled from a temperature of 1850 F, then tempered at 350 F for six hours. This results in a Rockwell C hardness of 60-62.

Ludlum Ontario is an air hardening die steel of the high carbon/high chromium type. It has all the desirable properties of such steels—resistance to abrasion, high hardness and excellent non-deforming characteristics. In addition, it is tougher but easier to machine than the higher carbon/high chromium types which are usually oil hardening.

For the finest in tool steel to help solve your cutting, forming, or blanking problems, call your nearest A-L office or distributor today, or write **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.**

Write for your **ONTARIO BLUE SHEET**

A concise 4-page booklet of facts on the handling and shop treatments of Ontario. Included is complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. Ask for your free copy.

Address Dept. M5-68

For complete **MODERN** Tooling, call
Allegheny Ludlum



For more data circle 277 on Reader Service Card

DE Vlieg

OF DETROIT

brings you a new addition to the
Famous Microbore Line
OF PRECISION TOOLING

the perfect combination...

MICROBORE
FLASH-CHANGE
TOOL HOLDERS

Microbore
PRECISION TOOLING

A proven
quick change
tooling system

FOR USE ON ALL TYPES OF
BORING MACHINES and MILLING MACHINES

• DE Vlieg MICROBORE CO. 2720 West Fourteen Mile Rd., Royal Oak, Mich.

Tools Changed in Seconds!
Positive Repositioning
of Boring Bars!
Fast and Accurate
Setting of Boring Tools!

Manufacturers Representatives:
A few desirable territories
are being opened and
qualified representatives are
invited to visit our booth
at the Machine Tool Show.



See the comprehensive range of Flash-Change
equipment and Microbore Precision Tooling
at the DeVlieg Exhibit, Machine Tool Show,
at Chicago, September 6-17, Booth 1317.

DE Vlieg MICROBORE CO. • 2720 WEST FOURTEEN MILE RD., ROYAL OAK, MICHIGAN

For more data circle 278 on Reader Service Card

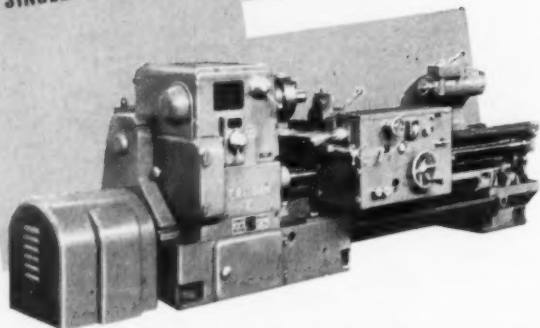
August, 1955

modern machine shop 79



**NEW HEAVY-WEIGHT
CHAMP**

CRI-DAN "E"
SINGLE POINT THREADING MACHINE



SPECIFICATIONS

Threading Range 2TPI-48TPI
Max. Thd. Dia. (Internal) . . 16" Dia.
Max. Thd. Dia. (External) . . 12" Dia.
Max. Swing Over Ways . . . 25" Dia.
Max. Swing Over Tool Slide 12" Dia.
Max. Thread Length 6½"
Max. Taper of Thds. 16° Included
Multi-Start Threads Yes
Spindle Speeds . . . 50-1400 R. P. M.
Main Motor 20 HP
Floor Space Req'd. . . 5' 6" x 14' 0"
Approx. Weight 4½" Tons
Length Between Centers 66" Standard

The new CRI-DAN "E" is truly a heavy-weight champion when it comes to performance, versatility and capacity. Not only do you get High-speed threading but also built-in facilities for secondary turning, boring, facing and chamfering. Complete hydraulic and electric controls assure maximum efficiency even on heavy applications.

Write today for the full CRI-DAN "E" story on this new, heavy-weight champ that beats any other threading method.

CRI-DAN DIVISION

the **LEES-BRADNER**
CLEVELAND 11, OHIO, U.S.A. *Company*

For more data circle 279 on Reader Service Card



CIMCOOL

How to keep jobs cool every day of the year...

... **SWITCH TO CIMCOOL**®, the radically new and different cutting fluid that cools so fast tools and chips actually stay cool to the touch. And here are two more reasons why CIMCOOL Concentrate has become, in just a few short years, the largest selling chemical cutting fluid in the world:

- **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and increases tool life, for it combines friction reduction and cooling capacity in a degree never before attained.

We'll be happy to supply information on the many specific advantages of CIMCOOL Concentrate—or details on the entire family of CIMCOOL Cutting Fluids. Just contact us. Wire, write, or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

®Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL Concentrate—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT Base Additive—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL Bactericide—The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL Machine Cleaner—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL

Cutting Fluids

100%
for ~~85%~~ of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.



Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the **CROSS** Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers 1/4" flow control valves and remote control panels.

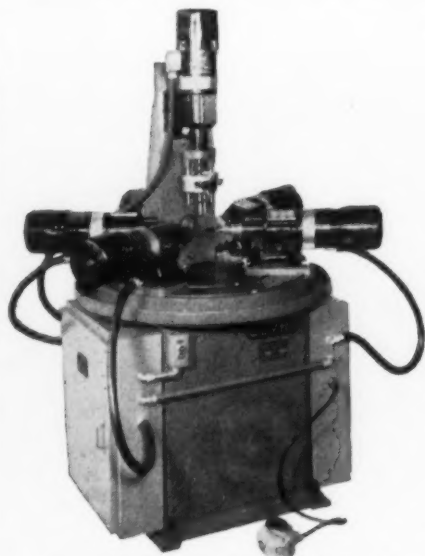
For full details, write Dept. A-68.

- Eliminates Tampering
- Stops Costly Shutdowns
- Prevents Tool Abuse and Breakage
- Protects Machines Against Overloads
- Reduces Maintenance Costs

Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN

For more data circle 281 on Reader Service Card



**Standard machine equipped
with a standard vertical
bracket**

7 HOLES AT ONCE WITH A STANDARD RADIAL HOLE DRILLING MACHINE

Why build a special machine for drilling radial holes when a standard machine equipped with Govro-Nelson Automatic Drilling Units will, in many cases, perform the work of a special machine that would cost considerably more!

Any number of drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.

The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of 1/32" to 3/8" on drilling operations and 0-80 to 3/8-16 on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

If you are interested in reducing the cost of your radial drilling and tapping operations, write for price and dimensional data.

**WRITE FOR
*Literature***

GOVRO-NELSON CO.

Machinists of Precision Parts for 32 Years

**1933 Antoinette
Detroit 8, Mich.**

Automatic

DRILLING UNIT

For more data circle 282 on Reader Service Card



Chicago Pneumatic Tool Company, Dept. M1
8 East 44th Street, New York 17, N. Y.

Please send me FREE booklet SP-3164 "Magnamatic Case Histories."

Please send me "Magnamatic" Bulletin SP-3126.

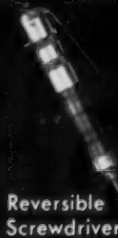
Have representative call.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____



Reversible
Screwdriver



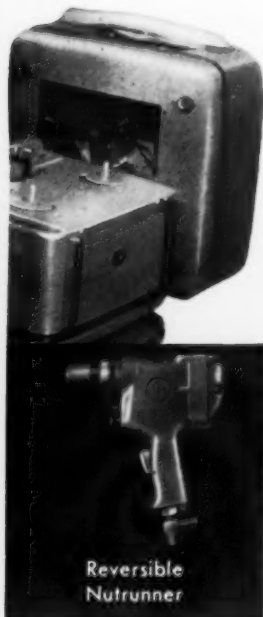
Screwdriver

NEW!

Controlled-Torque
**power
screwdriver-
nutrunner**

the revolutionary CP "Magnamatic"

**with the
one-shot clutch**



Reversible
Nutrunner

An air-driven torque screwdriver-nutrunner that can be preset to run screws and nuts to specified torque — that's the CP One-Shot "Magnamatic." In design and operation "Magnamatic" is entirely new, but thoroughly proved in more than eighteen months of field testing and operation on production lines:

— an Alnico magnetic One-Shot clutch, adjustable to specified torques, disengages completely the instant the fastener is driven to desired tightness. The clutch does not impact or ratchet — the irritating "buzz" of conventional tools is eliminated. Maintains the selected torque setting indefinitely — has no clutch jaw wear. Inexperienced or fatigued operators can't burr screw heads, strip threads, shear fasteners, or damage work surfaces. Screw bits last longer. It's impossible to overdrive a screw with "Magnamatic" no matter how long the tool is held on the work.

A complete line of "Magnamatic" Screwdrivers, reversible and nonreversible types, in capacities from #4 screws to $\frac{3}{8}$ " bolt size, is now in production.

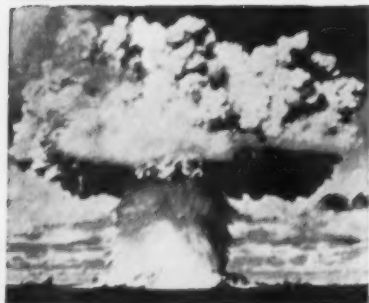


Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

Pneumatic Tools · Air Compressors · Electric Tools · Diesel Engines · Rock Drills · Hydraulic Tools · Vacuum Pumps

For more data circle 284 on Reader Service Card

Checked for accuracy by **ATOMIC LIGHT**



JOHANSSON GAGING EQUIPMENT



**Assures You Precision to the
Finest Degree, to Meet Your
Most Exacting Requirements—
Backed by the Name Supreme
in the World of Measurement.**

Swedish Johansson Gage Blocks are checked for accuracy by the latest scientific method, the atomic light, utilizing the lightwaves emitted from the Mercury isotope 198, now in use at the standard Bureaus throughout the world.

GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

INTERNAL INDICATORS

(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

MIKROKATOR

(Amplifier — for outside measurements)
Graduations .0001 to .000002 or .001 M to .0002 M.

OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.

Write for Literature

C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.
10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

For more data circle 285 on Reader Service Card



Here's a New Time-Saving Tooling Idea!

COMPLETE STOCKS OF DAVIS BLANK-BAR FLYCUTTERS LET YOU TOOL UP FASTER BY MACHINING ANY SHANK OR PILOT STYLE DESIRED RIGHT IN YOUR OWN SHOP

Now at Davis you can choose from 11 different Super Micrometer-Adjustable Flycutter Tools—4 with 18 inches of blank bar on each side of the cutter, and 7 with unfinished shanks—and save a lot of tooling time and money by machining the bar sections to your own requirements.

Cutter adjustments to within 0.0001" are obtained by merely turning the dial of the simple, sturdy Davis micrometer mechanism. Both heavy roughing cuts and fine finishing cuts can be made with these versatile, precision tools.

Write for Bulletins DB 110 and 112.

7 DIAMETERS OF UNFINISHED- SHANK STUB BORING TOOLS

Davis Stub Boring Tools with Unfinished Shanks handle a range of bores from 1 1/4" to 7" diameter. Overall length runs from 12" to 19". Diameter and length of the unfinished portion provide ample stock for machining a shank exactly to fit your particular type and size of vertical boring mill, horizontal boring machine, engine or turret lathe, or radial drilling machine.

Immediate Delivery!

4 DIAMETERS OF 36" LENGTH UNIVERSAL BAR BLANKS

Davis Bar Blanks handle a range of bores from 1 1/2" to 4 3/8" diameter. Bars are finish ground with a tolerance of ± 0.001 " over their entire length. With 18" of full diameter blank on each side of the flycutter, tools can be cut to any desired length and provided with taper shanks, drive flats, flange or sleeve mountings, pilot ends, or made into stub bars.

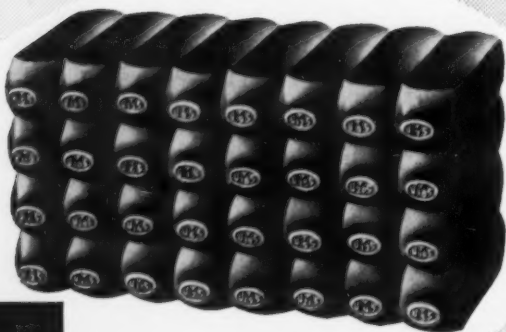


DAVIS

BORING TOOL DIVISION OF
Shelbings & Lewis Machine Tool Company
Fond du Lac, Wisconsin



THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING



RETAIN CONTROL

with INSPECTION and CODE STAMPS



These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

"IF IT'S WORTH MAKING, IT'S WORTH MARKING"...



Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.

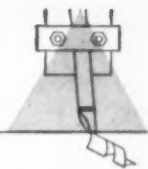
GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue

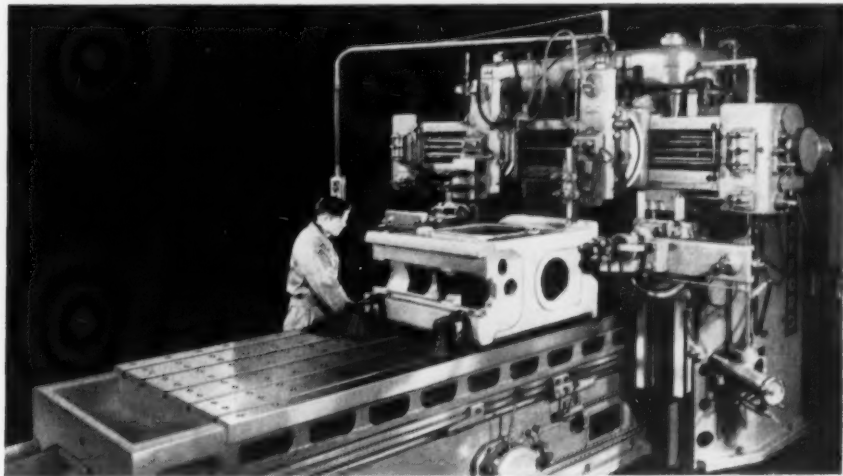
Chicago 13, Illinois

For more data circle 287 on Reader Service Card

a cost cut... with every stroke
of rockford hydraulic-driven



planers



higher production is obtained with every stroke **because...**

the great new Triple Circuit offers the correct combination of cutting speed and force to most economically machine materials from the free-cutting types to the toughest steel.

Send us your Planing specifications.
Ask for full details of the Triple
Circuit planing efficiency.



ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

For more data circle 288 on Reader Service Card

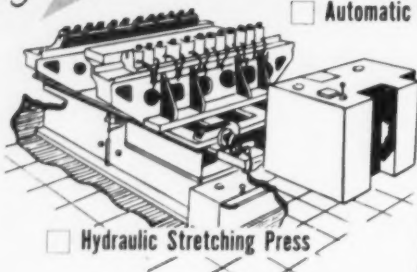
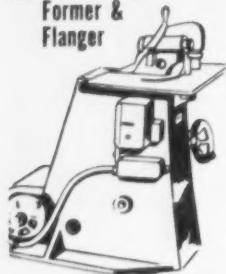
August, 1955

modern machine shop 89

Which of these **ERCO** MACHINES fits your needs?

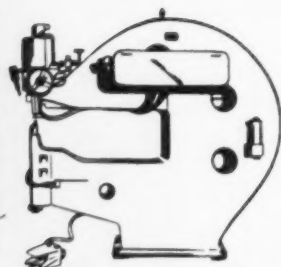
Check the following

- ☐ Sheet Metal
Former &
Flanger



- ☐ Hydraulic Stretching Press

- ☐ Shrinker & Stretcher



- ☐ Automatic Puncher & Riveter
☐ Automatic Drill Riveter

Engineering and Research,
Riverdale, Md.

Please send additional information about
the machinery checked above to:

Name.....

Title.....

Firm.....

Address.....

**Cut costs . . . increase
production in your plant
with ERCO equipment**

Machine tool design and production has been an ERCO specialty since its beginning days. The machine tools shown on this page are the result of a continuing search for improvement . . . to provide industry with faster, more accurate, less costly production.

ENGINEERING and RESEARCH

A DIVISION OF **ACF** INDUSTRIES
INCORPORATED

RIVERDALE, MARYLAND

For more data circle 209 on Reader Service Card

**Improve your product quality
with precision lapped parts!**



Enlarged Norton job lapping service

Complete and modern in every detail, the new Norton Job Lapping Department is ready to finish parts to your exact specifications.

Here, Norton machines for every type of lapping are operated by expert personnel. Results are checked on the latest inspection equipment, while precision accuracy is further assured by careful atmosphere control. Extensive job-range covers the following:

Materials — Practically unlimited in range, including hardened steel, stainless steels, stellite facings, cast iron, non-ferrous pressed and die-cast parts.

Types of Lapping — Single and parallel face flat lapping, to specifications ranging from stock removal to optical flatness. Also, external cylindrical lapping to high precision requirements.

Workpiece Capacities — Flat work up to 24" across. Cylindrical work from $\frac{1}{16}$ " diameter by $\frac{1}{8}$ " long to 2" diameter by 8" long.

The entire project is under direct supervision of Norton Lapping Engineers, pioneers in the development of mechanical lapping processes and machines. They are prepared to work out the best lapping techniques for your requirements. For full details, see your Norton Representative or write us direct. **NORTON COMPANY, Machine Division, Worcester 6, Mass.**

To Economize, Modernize With NEW

NORTON
GRINDERS and LAPPERS

Making better products... to make other products better

District Sales Offices: Hartford • New York • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

For more data circle 290 on Reader Service Card

August, 1955

modern machine shop 91

to cut machining costs

machine faster with

Continuous Broaching



■ Higher machining production than ever achieved by any other method has been made possible in many cases through the use of the Footburt Continuous Surface Broaching Machines. In most cases, production is limited only by the speed at which parts can be loaded into the self-clamping fixture. Unloading is automatic. If you have a problem of high production on small parts, send blueprints and hourly requirements.

THE FOOTE-BURT COMPANY

Cleveland 8, Ohio

Detroit Office: General Motors Building

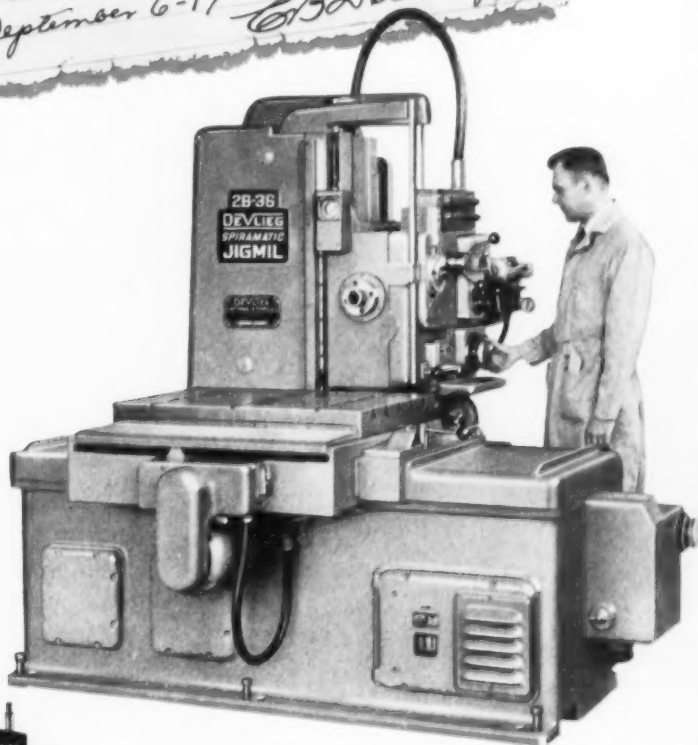
*Engineered
for
production*

FOOTBURT

PIONEERS IN SURFACE BROACHING

For more data circle 291 on Reader Service Card

Be sure to see this Brand New
 Model 2B-36 De Vlieg Spiramatic
 Jigmil which will be introduced at
 The Machine Tool Show at Chicago -
 See this new machine "JIGLESS BORING"
 parts under production conditions
 at the De Vlieg Exhibit, Booth 1317,
 September 6-17 C. B. De Vlieg



DE Vlieg MACHINE CO., 450 FAIR AVE., FERNDALE • DETROIT 20, MICH.

For more data circle 292 on Reader Service Card

**"King-size"
turning jobs
call for
Nebel power,
speed and
accuracy**

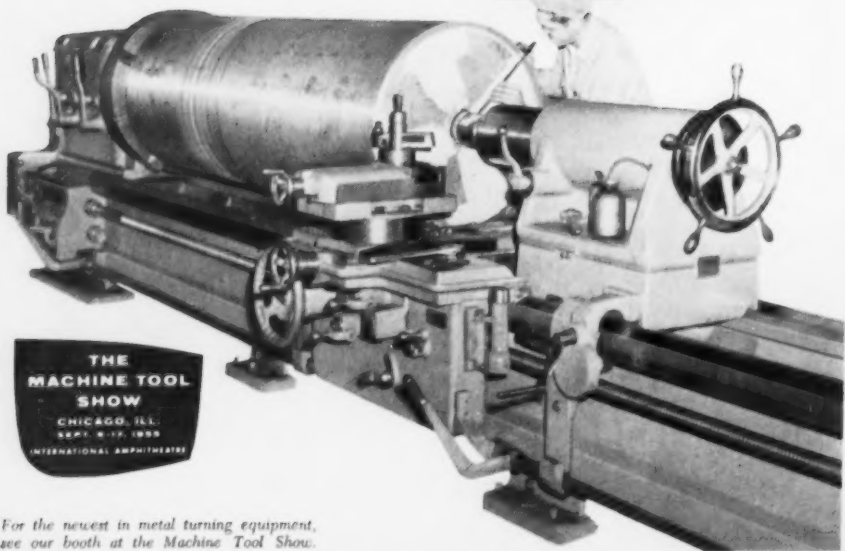
You need the ample facilities of Nebel lathes to turn heavy jobs like this huge steel mill roll. The 36" Nebel 'F' series heavy duty engine lathe—shown on the job at Lukens Steel Company, Coatesville, Pa.—has the stamina to support such enormous loads...and the power to turn them *quickly and accurately* day after day.

Secret of Nebel performance is in the Nebel engineered headstock — now equipped with shaved and hardened steel gears and Timken anti-friction bearings throughout.

Performance plus price. Only Nebel brings you the combination of outstanding performance and low price. Nebel engine lathes are made in six swing sizes, 16" to 36". Write today for descriptive bulletins.

The Nebel Machine Tool Co.
3409 Central Parkway, Cincinnati 25, Ohio

Nebel
LATHES
CINCINNATI



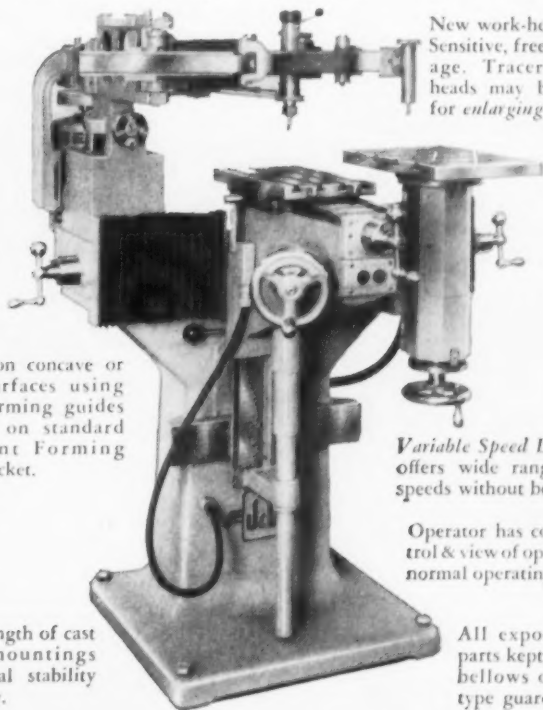
For the newest in metal turning equipment,
see our booth at the Machine Tool Show.

For more data circle 293 on Reader Service Card

NEW 3D DIMENSIONAL

"Panto-Miller"

Here's full 3-dimensional pantograph-milling performance for precision and production. Each part of this completely new Model 3-A "Panto-Miller" is specifically designed and engineered for dependable, accurate reproduction of 3-dimensional surfaces, flat or curved. It is a sturdy, large-capacity, production machine, worthy of your investigation.



New work-height capacity. Sensitive, free-moving linkage. Tracer and cutter heads may be transposed for enlarging copy.

Engraves on concave or convex surfaces using simple forming guides mounted on standard equipment Forming Guide Bracket.

Variable Speed Drive control offers wide range of cutter speeds without belt changing.

Operator has complete control & view of operation from normal operating position.

Massive strength of cast base and mountings gives unusual stability and accuracy.

All exposed moving parts kept chip-free by bellows or telescope type guards.

The "Panto-Miller" is the answer to many standard and special problems in producing or reproducing 3-dimensional surfaces. Write for bulletin PM3



ESTABLISHED 1870

JOHNSON & BASSETT INC., Production Tool Div., Worcester, Mass.

LW

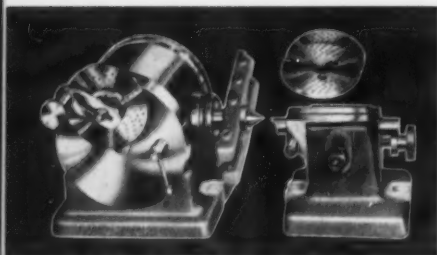
*America's Largest
Builders of*

DIVIDING HEADS

MODEL SD

6½" Swing. Spindle threaded 1½"-8.
⅝" table slot tongues. 36 lbs.

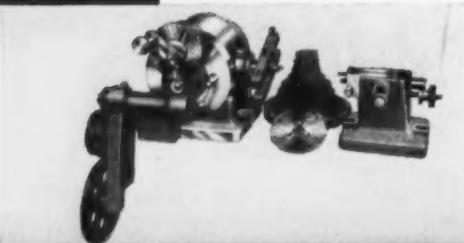
\$145.00



MODEL AU

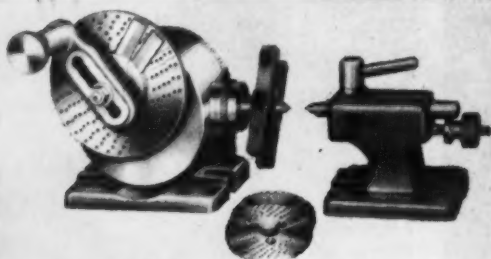
11" Swing. Fully universal for complete indexing and spiral cutting. Spindle threaded 2¼"-10. ⅝" table slot tongues. 190 lbs.

\$367.00



Accurate,
Heavy Duty

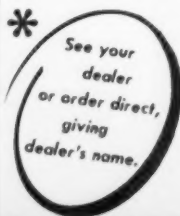
Ball bearing thrust on worm shaft and rear end of spindle. Headstock spindle has threaded nose. Large tapered bearing adjustable for end play. Head tilts past 90°. Worm wheel and alloy stress-proof steel worm cut to close limits for accuracy. Complete with three index plates for dividing all numbers to 50 and even numbers to 100 except 96T. Index chart shows all divisions obtainable to 380. Specify left (illustrated) or right hand model.



MODEL BP

11" Swing for plain milling machine. Spindle threaded 2¼"-10. ⅝" table slot tongues. 140 lbs.

\$250.00



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

28 South St. Clair Street
Toledo 4, Ohio

Logan air valves

A model to effectively meet practically any air control valve requirement.

Designed to assure maximum efficiency with a minimum of maintenance.

most models stock delivery

Logan Air Control Valves are designed and built to assure an unusually high standard of performance plus maximum convenience for the design engineer, machine operator and maintenance man. Every construction detail has been planned to make Logan valves easy to install, to use and to service.

Thousands of manufacturers have found Logan valves to be the answer to their production problems. Logan engineers are at your service to help you achieve better, more efficient production. Following are a few facts about Logan Air Control Valves:

Standard valve models are available in a wide range of mounting types, means of actuation, type of handle and sizes.

Can be located in any position on horizontal, vertical or other surfaces. Mounting is simple.

Construction is compact—permits installation in limited space, close to other equipment.

All valves are built for operating pressures to 150 psi. For reuse, many Logan valves can easily be converted to other types. Parts are interchangeable.

The wide choice of types of control makes it possible to provide the most convenient type of actuation for every problem of regulation.

Effortless control is provided in all models. Balanced construction produces equal pressure on both sides of piston.

Valve piston is light in weight, permitting high-speed operation without excessive vibration or wear.

Long-life synthetic rubber cup packings on valve piston assure positive action without leakage.

Piston-type valve with sliding piston eliminates valve seats; minimizes wear.

Self-cleaning construction means longer sealing life.

Valves are unusually easy to repair or recondition. Simply by removing cover screws—covers and valve piston can be quickly removed and replaced.

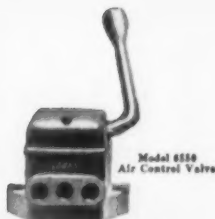
If a few spare pistons are carried in stock, a Logan air valve can be reconditioned with only a few minutes of downtime. Write for Logan Catalog 100-4.

MEMBER—
National Tool Builders Assn.
National Fluid Power Assn.



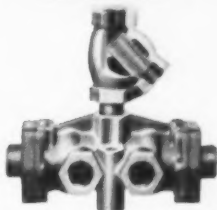
AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR/HYDRAULIC CYLINDERS, Cat. 100-3
AIR AND HYDRAULIC PRESSURES, Cat. 01 • COLLET GRIP TUBE FITTINGS, Cat. 200-5 • HYDRAULIC CONTROL VALVES, Cat. 200-4
HYDRAULIC CYLINDERS, Cat. 200-2, 200-3 • HYDRAULIC POWER UNITS, Cat. 200-1 • SURE-FLOW COOLANT PUMPS, Cat. 02

LOGANSPOUT MACHINE CO., INC., 801 CENTER AVE., LOGANSPOUT, IND.



Model 0550
Air Control Valve

82 models



Model 0201
Air Control Valve



Cross-section view
of Model 0550



Cross-section view
of Model 0201

Let Logan Engineers
help you design your Air
and Hydraulic Circuits.
No obligation.

For more data circle 296 on Reader Service Card

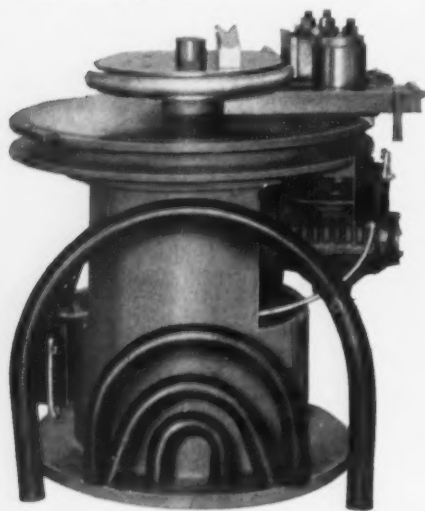
reach!

A NEW PEAK IN BENDING EFFICIENCY

Pedrick Production Benders offer new standards of efficiency and economy for all pipe, tube and structural bending. Even the most difficult bends can now be made on a production or jobbing basis.

Let us know your problem — and supply a cost-cutting solution.

Write PEDRICK TOOL & MACHINE CO.,
3640 N. Lawrence St., Philadelphia
40, Pa. Dept. 5.



FREE "PEDRICK LINE" BULLETIN.
WRITE TODAY.

PEDRICK

production benders

For more data circle 297 on Reader Service Card

this
RODGERS PLATEN PRESS
 produces
GRIDDLES
 at a sizzling rate!



Ever since they changed from a mechanical press to a Rodgers 100 ton Hydraulic Platen Press, Northland Aluminum Products of Minneapolis has reported they are not only pleased, but also surprised at the unusual results. No wonder! . . . production is up . . . product quality and finish is better . . . die wear is reduced . . . and die setup time is less. All these advantages are vitally important to Northland for they make a variety of products like Nordic Ware Aluminum Utensils, Griddle King Griddles and Steak Platters.

Although you may produce an entirely different line of products you probably would find a Standard Rodgers Platen Press would offer you the same advantages . . . whether your jobs are stamping, forming, drawing, coining, or die try-out . . . in metal or plastics.



*Write for the new Illustrated
 Rodgers Blue Ribbon Catalog*

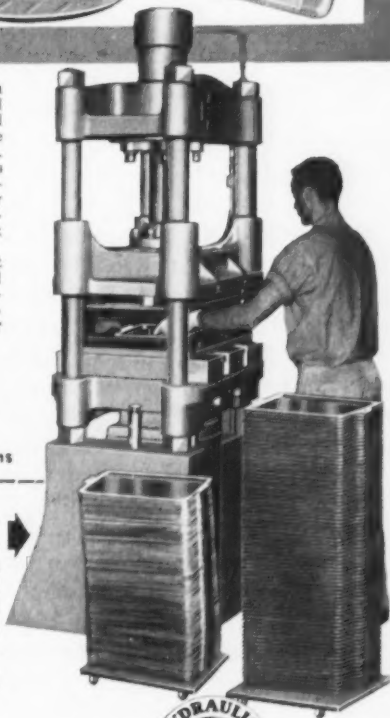
it gives complete details and specifications

**RODGERS BLUE RIBBON
 PLATEN PRESSES FOR:**

- Metal Drawing and Forming
- Plastic and Rubber Molding
- Die Try-Out General Assembly and Utility Work
- Capacities from 10 to 500 tons pressure



Here is the Rodgers 100 ton Hydraulic 24"x24" Platen Press which blanks and forms Northland Griddle Kings at the rate of 8 per minute. Aluminum is .153—finished size is 10 3/4" x 17 1/2".



Rodgers Hydraulic Inc.

7447 Walker St., Minneapolis 16, Minn.

For more data circle 298 on Reader Service Card

OVER THE EDITOR'S DESK . . .



LONGEVITY

A friend of ours in New Zealand who reads *Modern Machine Shop* regularly has written to us an interesting letter which illustrates very well the point that with proper care and maintenance, machinery can be made to function efficiently over a long period of use.

He writes: "My Essex car originally belonged to a man who died before he had driven it 1000 miles. His wife had the car put up on blocks in the garage and it stayed there for nearly nine years. The car was eventually sold, at a low price, to the man from whom I subsequently purchased it. The speedometer had just over 3000 miles showing on it.

"The man from whom I purchased the car had gotten into financial difficulties and I was able to buy it for 40 pounds. Being a motor engineer by trade, I completely overhauled the car—an open type 1927 model. The car was overhauled a second time, when I replaced the original car body with a 1928 sedan 4-door body.

"I do all of my own lubrication

and general servicing and, of course, keep a mechanically inclined ear on all car operations. The speedometer now shows over 82,000 miles and the car still runs well, averaging 25 miles per gallon on long trips."

Although we are not advocating that our readers attempt such major maintenance and repair jobs as outlined in the above letter, we do think there is a lesson to be learned from this story; namely, that proper care and maintenance, regardless of the type of machinery, do pay off!

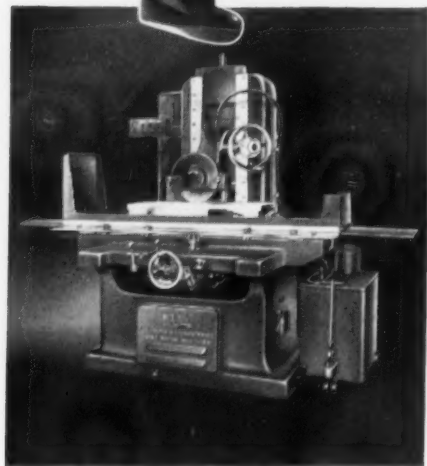
★ ★ ★

MODERN TOOLS

Harold Brayman of E. I. du Pont de Nemours and Company writes: "The great difference in the productivity of the Asiatic coolie and the American working man is the fact that the American has behind him all the nation's technology, training and the most modern tools and facilities. Two thousand men in the modern Du Pont neoprene plant at Louisville, Kentucky, can produce as much rubber annually as 80,000
(Continued on Page 103.)

FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER
This precision tool room type machine has table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2560 rpm.



Just a note on your letterhead will bring you full details.

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.



BEECH



BELL



BOEING



CHANCE VUGHT



DOUGLAS



GRUMMAN



LOCKHEED



MARTIN



McDONNELL



NORTHROP



REPUBLIC

GALLMEYER & LIVINGSTON COMPANY 408 Straight Ave., S.W., Grand Rapids, Michigan

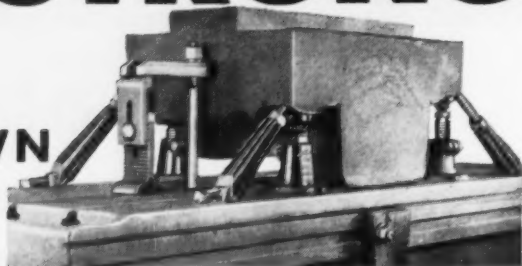
For more data circle 351 on Reader Service Card

August, 1955

modern machine shop 101

ARMSTRONG

SET-UP *and* HOLD-DOWN TOOLS



**PLANER
JACKS**



**NON-SKID
JACKS**



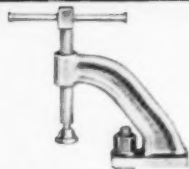
**STEP
BLOCK**



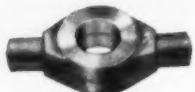
UNIVERSAL CLAMP



T-SLOT BOLTS AND NUTS



T-SLOT CLAMP



STRAP CLAMPS

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents.

Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5228 W. Armstrong Ave., Chicago 30, U. S. A.

See us at Booth No. 550 Metalworking Machinery & Equipment Exposition
Chicago Coliseum, Sept. 6-17

For more data circle 352 on Reader Service Card

(Continued from Page 100)

Malayans laboring all year from dawn to dusk on the plantations in the steaming jungles of Indonesia. The difference is that the Americans have in the neoprene plant a multi-million dollar tool not available to their Asiatic counterparts."

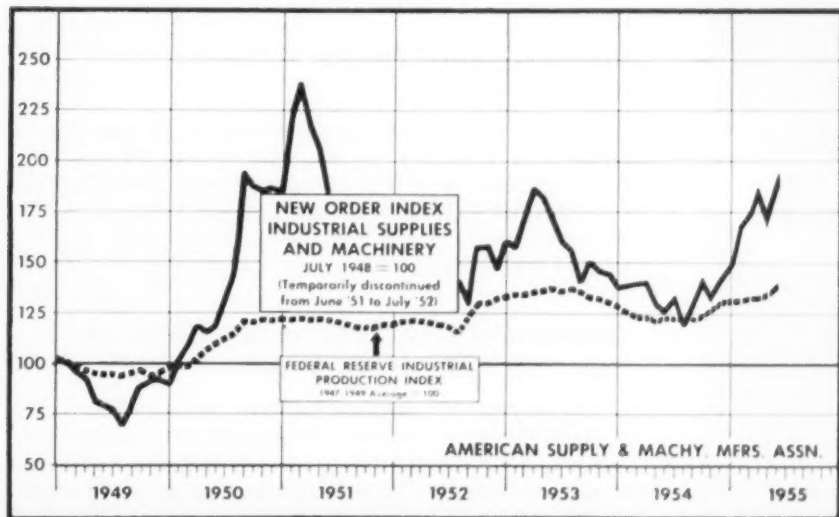
★ ★ ★

NEW ORDER INDEX

The new order index of industrial supplies and machinery has hit its highest point since the Korean War. The index for May, as reported by the American Supply and Machinery Manufacturers' Association, was 191.6. This means that dollar volume of orders was almost twice that of

the base month of July 1948. The May index of 191.6 registered a gain of 18 percentage points over the April 1955 figure of 173.7. In only four months since the index was established in July 1948 has the order volume exceeded the May 1955 figure. These four months were January to April 1951.

The index measures the volume of orders for industrial equipment, tools, and supplies received by Association members from industrial distributors. As the distributors supply the manufacturing industries, the sharp rise in the new order index presages a further rise in the volume of industrial production. The Federal Reserve Industrial Product Index for May stood at 138 (preliminary), the highest point since the current index was established.



**MACHINING OPERATIONS ON PARTS
FOR JEFFREY PRODUCTS • By Fred W. Vogel**

This article illustrates and describes several interesting machining operations performed at the main shop of Jeffrey Manufacturing Company at Columbus, Ohio, where mining, processing and handling equipment, chains, and transmission machinery and other related equipment are manufactured. Page 106.

**HIGH PRODUCTION WITH PROGRESSIVE
DIES • By Gilbert C. Close**

"The punch press is a highly versatile machine when properly tooled—especially with well designed progressive dies" is an opinion emphatically expressed in this article by Barry L. Miller, owner-manager of the Barry L. Miller Engineering Company, Hawthorne, California, where, at the present time, the design and production of intricate progressive dies for high speed repetitive production is the main operation. Page 114.

**NEW AUTOMATIC PRODUCES PARTS FASTER
By H. S. Sizer**

A description is given of the features of the new No. 00 Automatic developed by Brown & Sharpe Manufacturing Company, Providence, Rhode Island, which provides for faster production and increased accuracy in the manufacture of a wide variety of small turned parts. Page 120.

**TRANSMISSION EXTENSIONS MACHINED ON
TRANSFER PLATE-TYPE FIXTURES**

Using a special 10-station machine built by W. F. & John Barnes Company, Rockford, Illinois, a leading automobile manufacturer processes transmission extensions from rough castings to finished workpieces at the rate of 150 per hour. Page 124.



**FEATURES
IN THIS
ISSUE**

MACHINING ONE-PIECE AIRCRAFT WING PANELS

The discussion covers a huge 450,000-lb. "skin mill" completed recently by the Simmons Machine Tool Corporation, Albany, New York, and shipped to the North American Aviation Company of Los Angeles where it will be used for sculpturing, in one piece, wing panels employed in building the F-100 Super-Sabre Jet. Page 127.

MODERNIZATION AND NATIONAL DEFENSE

By Ralph S. Howe

Survival in a competitive economy and survival in national defense depend upon the installation of modern machine tools, according to the author of this article, who is president of The New Britain Machine Company and chairman of the Sub-Committee on Permanent Defense Capacity of the National Machine Tool Builders' Association. Page 128.

TAPE-AUTOMATED MACHINING

This article describes in detail the new Numericord System developed by the Giddings & Lewis Machine Tool Company, Fond du Lac, Wisconsin, which automates machine tools for the production of precision parts from numerical data. Page 138.

FLAME-PLATING SEWING MACHINE FEED DOGS

The application of Linde Air Products Company's unique Flame-Plating process to the tungsten carbide coating of standard steel sewing machine feed dogs to increase service life is discussed in this article. Page 150.


WORN VALVES RECLAIMED BY METALLIZING

A brief story of how the reclamation department of the Standard Oil Company of California plant in La Habra began using the metallizing process on worn refining valves and some of its opinions and experiences to date. Page 154.


**FEATURES
IN THIS
ISSUE**



Machining Operations For Jeffrey



Aerial view of The Jeffrey Manufacturing Company plant located at Columbus, Ohio.



General view of the main machine shop at the Jeffrey Columbus, Ohio, plant.

s on Parts y Products • • •

A glimpse at several interesting machining operations performed at main shop at Columbus.

By FRED W. VOGEL
Editor

In an attractively illustrated booklet issued to visitors of The Jeffrey Company plants is a statement to the effect that the company, along with its subsidiaries and associated companies, is a manufacturer of equipment designed to serve the needs of all industry. Leafing through the booklet, the visitor finds convincing evidence to back up the statement. For example, Jeffrey operates the largest plant of its kind in the world for the manufacture of mining, processing and handling equipment, chains, transmission machinery and other related equipment.

Besides the manufacture of this equipment, competent engineering facilities are available for laying out complete handling and processing systems. Jeffrey operates plants in Canada, England, and South Africa and maintains a network of sales offices, warehouses, and representatives in principal business centers throughout the world.

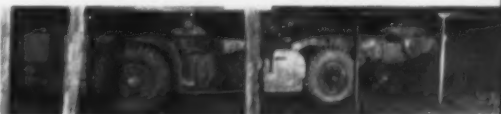
During a recent tour through the Columbus facilities, which plant incidentally is designated as The Jeff-



Jeffrey 40-ton trolley type tandem locomotive.



Jeffrey Colmol continuous mining machine.



Jeffrey pneumatic tire mounted coal cutter.



Bucket elevator setup for handling chemicals.



Belt conveyor installation at ore unloading.

"... the blades ... will range in length from 18 inches up to 6 feet."

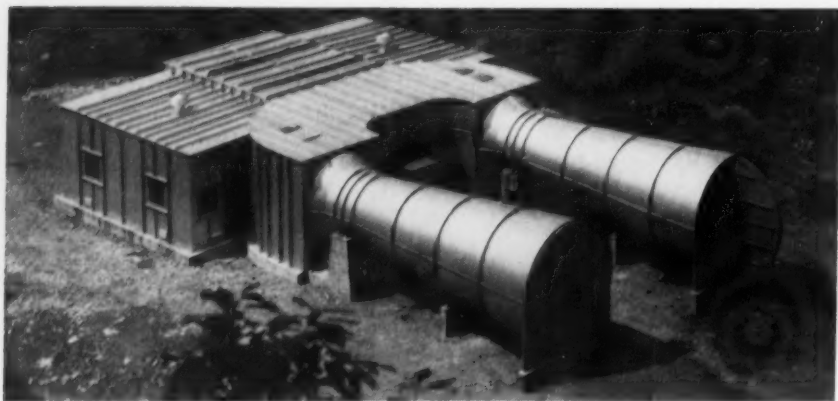


Fig. 1—Jeffrey AERODYNE mine fan installation for furnishing fresh air "down under."

rey Manufacturing Company and comprises the largest of the affiliated and associated companies, we viewed several operations that might be of interest to operators of other metal-working plants or departments. Description of these operations form the basis of the following article.

Among the many and varied products manufactured by Jeffrey is a line of fans designed for general and auxiliary ventilation of mines—for example, surface ventilating installations such as that illustrated in Fig. 1. These fans, known to the trade by the name of AERODYNE, are built in sizes to deliver up to 500,000 c.f.m. In order to eliminate vibrations and reduce noise to a minimum, the blades of the fan are carefully machined to exacting dimensions recommended by the engineering department.

Details as to the shape of two different blades for the AERODYNE type fan are shown in drawing Fig. 2. Depending upon the size and capacity of the fan itself, the blades, which are of cast aluminum, will range in length from 18 inches up to 6 feet. Machining blades of this type to exact lengths would be just another cut-off operation if it were not for the fact that the outer end of each blade requires a critical curvature. In order to machine the exact radius on the blade ends to the required curvature, the setup shown in Fig. 3 was devised.

As shown in the illustration, a special fixture is located on the cross slide of a standard engine lathe—in this case a 22-inch LeBlond. A 4-inch end mill is located in a collet in the headstock of the lathe. Immediately beneath the milling cutter, a

slide is provided upon which rests a holder which clamps the end of the blades. The entire fixture pivots on a frame mounted on the bedways toward the tailstock end of the lathe. To mill the radius, the socket end of the fan blade is located in the pivot fixture and the other end is located in the holding fixture on the slide beneath the milling cutter. Move-

ment of the cross slide handwheel actuates the blade across the face of the milling cutter which operates at a speed of 100 r.p.m. Depending upon the size of blade and amount of material to be removed, the feed varies between 0.004 inch and 0.030 inch.

Another interesting operation is the cutting of a compound screw

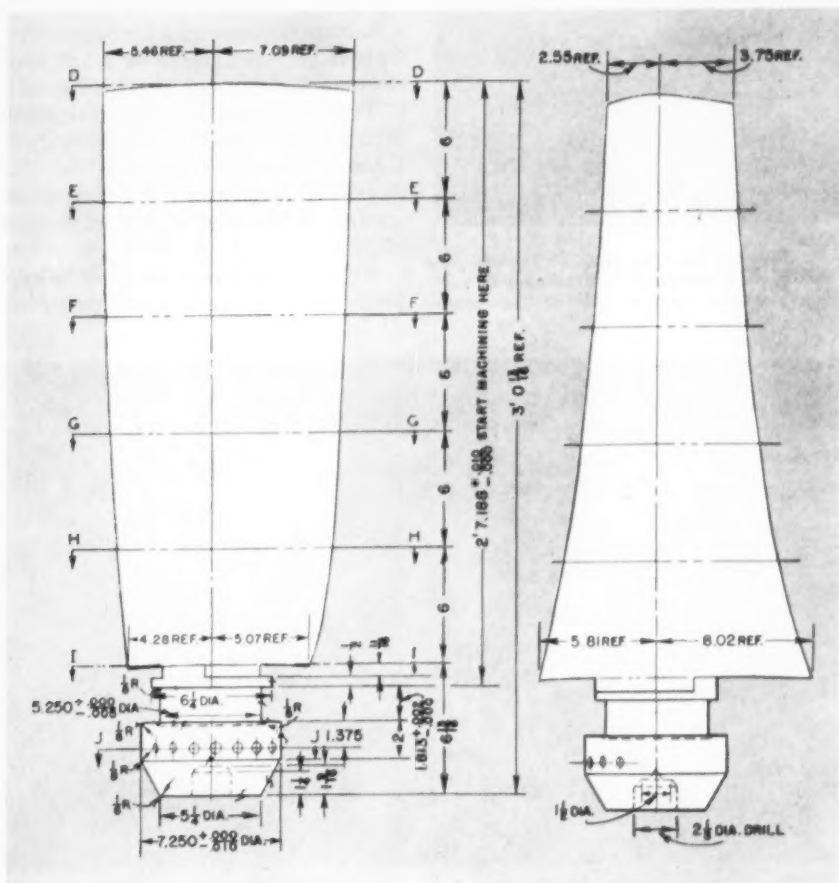


Fig. 2—Drawing of AERODYNE fan blade, showing two shapes in which the fan blade is available. Curvature and balance of the fan blade are achieved through proper machining.

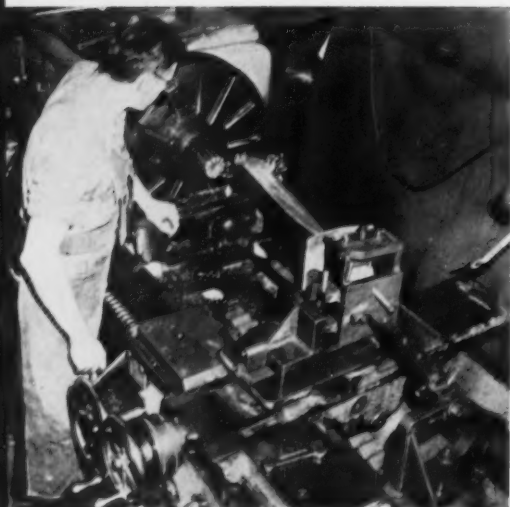


Fig. 3—View showing setup on LeBlond 22-inch lathe designed for the purpose of milling a radius on the end of fan blade.

"The workpiece revolves at the rate of 130 r.p.m."

which is used on a reel type winding mechanism. This operation is shown being performed in Fig. 4. The workpiece is 2 inches in diameter by 22 inches in length. The setup involves the use of a master screw located in a fixture between the bedways. Attached to this master is a follower device which guides the cutting tool.

The workpiece revolves at the rate of 130 r.p.m. The cut is 0.0075 inch. Once the setup is in operation, the operator can produce the compound screws at the rate of 30 per 8-hour shift.

Figure 5 shows a view of a specially designed cone worm polishing

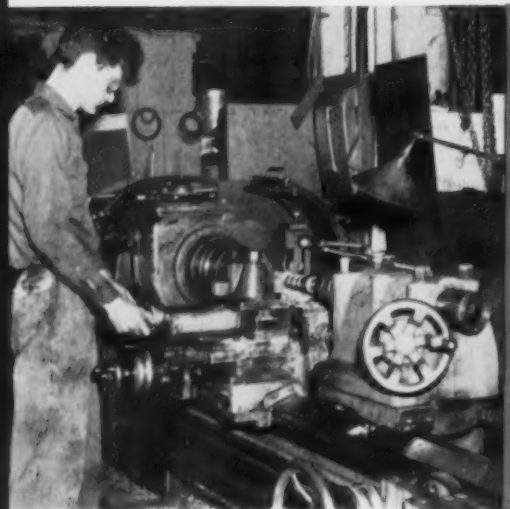


Fig. 4—Special setup for cutting compound screw thread. Bars threaded in this manner are used for reel type winding mechanisms.

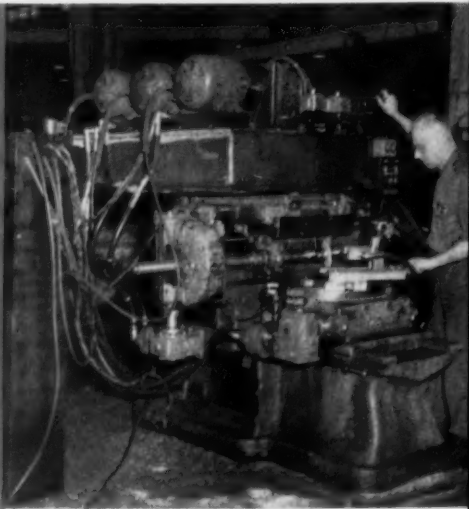


Fig. 5—Illustration showing a machine which is specially designed for the purpose of improving surface finish of machined cone worms.

machine which was built under the supervision of the man shown in the illustration. On many pieces of equipment manufactured at Jeffrey such as mining machines, speed reducers, and special machinery, the trend has noticeably been toward a greater use of cone worm driving equipment, the obvious advantage being that the cone worm provides greater contact than with a spur or helical type drive.

The primary purpose of the machine shown in Fig. 5 is to expedite removal of scratches from worm tooth surfaces. Prior to the development of this machine, the scratches were removed by means of hand-operated polishing equipment.

The polishing machine is capable of handling worm gears from $1\frac{1}{2}$ inches in diameter up to 5 inches in

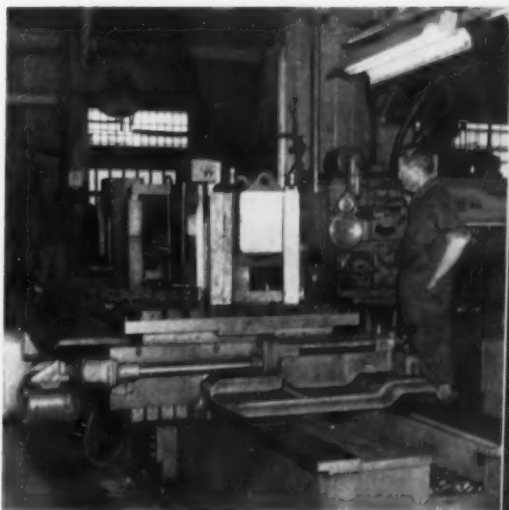


Fig. 7—Illustration showing a general view of DeVlieg Model 4-B Jigmill with Colmol head in machining position on the table.

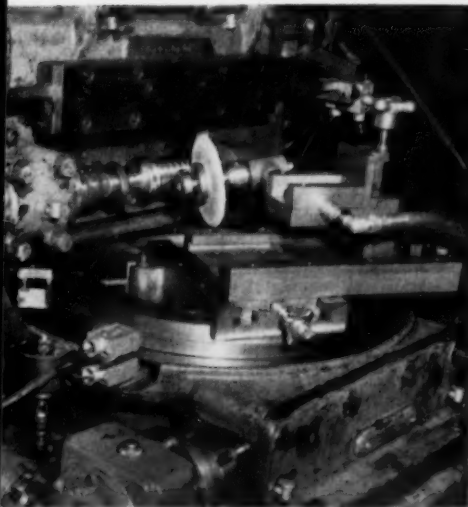


Fig. 6—Close-up view of cone worm polishing machine, showing the revolving type table on which polishing unit is mounted.



Fig. 8—Close-up view of Colmol head on table of DeVlieg Model 4-B Jigmill. Material of head is armor plate, $4\frac{3}{8}$ inches thick.

"The wheel is air driven under 80-lb. pressure and develops a speed up to 3,000 r.p.m.

diameter and 8 inches in length. The cone worm polisher is provided with a 20-inch circular table to which is attached an air-driven polishing wheel, as shown in Fig. 6.

The polishing wheel is of felt material of a maximum diameter of 8 inches. The wheel is air driven under 80-lb. pressure and develops a speed up to 3,000 r.p.m. During the polishing operation, Buckingham greaseless abrasive compound is applied to the felt wheel.

The design of the cone worm polishing machine calls for powering by means of three 2 h.p. three-phase 60-cycle 220-volt motors operating at 1,740 r.p.m. Each of these motors

is connected to a Jeffrey 2,000-lb. variable pump with rated capacity of from 0 to 40 gallons per minute. One pump is used to power the slide, another to power the spindle, and the third to power the circular table.

Figure 7 shows a general view of a Model 4-B DeVlieg Jigmil being used to bore a series of holes in a Colmol head. This Colmol head consists of a section of armor plate steel that is $4\frac{3}{8}$ inches thick. Actual boring is performed on 16 holes in the head ranging in size from $4\frac{1}{8}$ inches in diameter to $7\frac{1}{2}$ inches in diameter. Into these accurately bored holes will later be placed the bearing races that support the shafts to which the actual coal cutting tools are attached. The speed and accuracy with which the holes are bored has provided for a considerable increase in production of the Colmol heads. Figure 8 shows a close-up view of the armor plate head in position on the DeVlieg Jigmil.

Figure 9 shows an interesting application of a Hanchett grinding machine. As shown, a specially designed roll grinding fixture, together with workpiece in position, is located on the table of the machine. This fixture is powered by means of a 3 h.p. motor and is equipped with a speed reducer to provide for rotation of the workpiece at the rate of 50 r.p.m. The fixture was originally designed for the grinding of chilled rolls of the type that are intended for use in crusher housing where coal is pulverized before use. These rolls

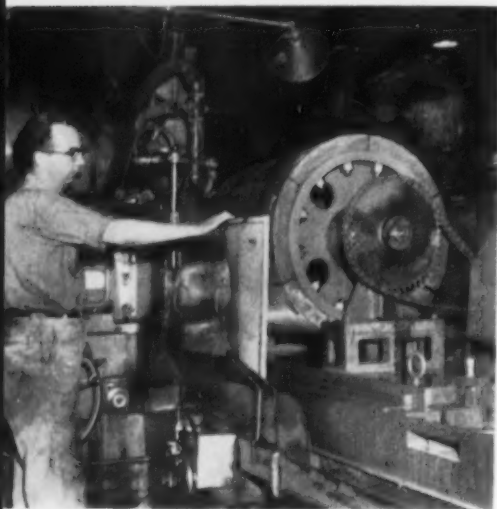


Fig. 9—View of Hanchett grinding machine equipped with a specially designed fixture for grinding chilled crusher housing rolls.

are available in a number of sizes and frequently up to 42 inches in diameter by 6 feet in length.

★ ★ ★

How to Run a Lathe. 53rd Edition. Published by South Bend Lathe Works, South Bend 22, Ind. 128 pages. Illustrated. 8 x 5 1/4 inches. Available in paper binding at \$.50 or in imitation leather fabrikoid binding at \$1.50 a copy, postpaid.

Used as a source of reference for the skilled machinist and as a textbook for students, this 53rd edition covers a large amount of new material, including the use of toolmaker's buttons for locating work on the lathe face plate and the use of the steadyrest, follower rest, internal grinding attachment and precision

gage blocks. The book consists of 11 chapters clearly written in non-technical language, making it easy for the beginner to understand. The text covers such items as the correct installation and leveling of the lathe; grinding cutter bits; turning; boring; thread cutting; taper turning; drilling; reaming; tapping; machinability ratings and cutting speeds for various kinds of steels; standard tolerances for press fits, running fits, push fits and sliding fits; allowances for finish turning, filing, polishing, grinding, reaming, lapping and honing; and lathe tooling dimensions.

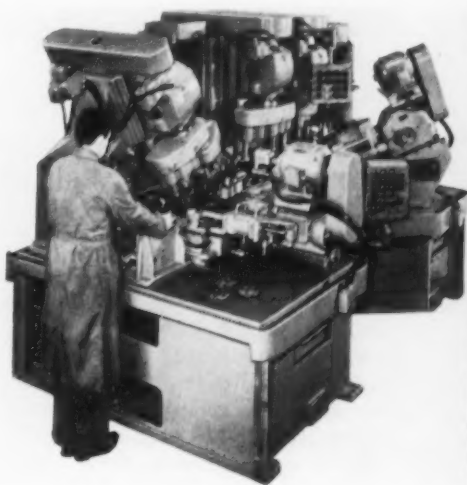
The book is a composite of 48 years of experience, countless hours of research and valuable ideas and suggestions submitted by hundreds of experienced shop men.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

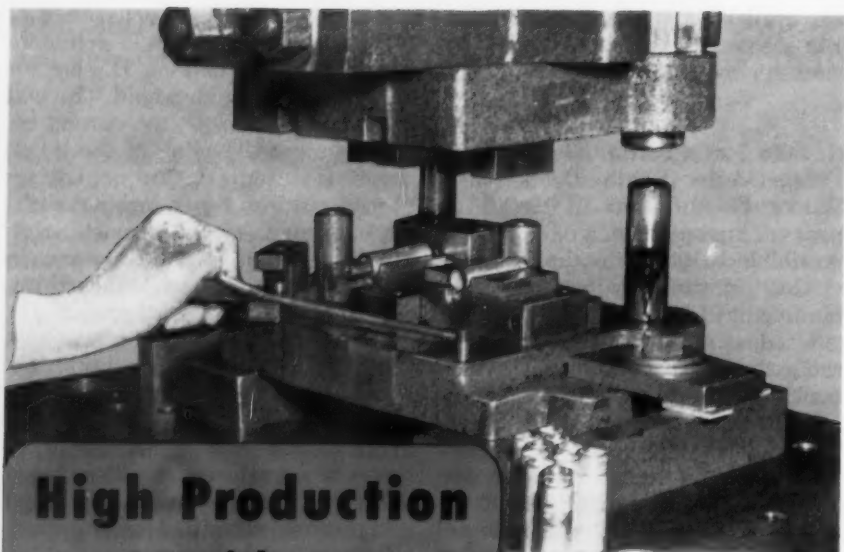
Drilling and Tapping Machine for Carburetor Bodies

The single purpose drilling and tapping machine illustrated here-with turns out 450 carburetor bodies per hour at 100 per cent efficiency. Built for a leading automobile manufacturer by The Hartford Special Machinery Co., Hartford, Conn., it is an eight-station multiple-spindle dual-loading transfer-type machine with five drill units, two tapping units and an air-hydraulic transfer mechanism. Various drilling and tapping operations are performed on the machine, the parts being located and clamped at each station in previously machined valve holes.

For more data circle 1 on Reader Service Card



This single purpose drilling and tapping is designed to produce 450 carburetor bodies per hour at 100 per cent efficiency.



High Production with Progressive Dies

By GILBERT C. CLOSE

"The punch press is a highly versatile machine when properly tooled—especially with well designed progressive dies."

Very few small shop operators take advantage of the inherent possibilities of the punch press is an opinion emphatically expressed by Barry L. Miller, owner-manager of the Barry L. Miller Engineering Company, Hawthorne, California. "Equip a punch press with a good

progressive die, and you have a tool that will out-produce many tools costing several times as much. Furthermore, the cost of production with these progressive dies is generally much less than with any other production technique available."

On this point, Mr. Miller speaks

(Above) Mandrel piercing die used to punch tubes from the inside. These tubes were formerly milled at a cost of 30 cents each.

Holes are now quickly and easily punched in the tubes with the progressive die setup shown at a cost of 6 cents for each tube.

with ultimate authority. Opening his own shop less than two years ago, he has already worked up an extensive business in both in-shop production and the design of progressive dies for outside concerns. But this is not a "flash in the pan." Prior to opening his own shop, he had spent some twenty years in experimental machine work, including die design, die making, and general shop practice.

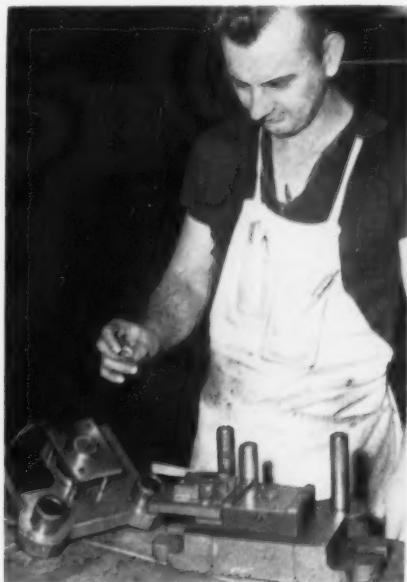
Mr. Miller points out that the design and production of intricate progressive dies for high speed repetitive production is the main operation in his shop at the current time. About 90 per cent of these dies are designed for outside firms. The

remainder are used for in-shop production. "In practically all cases we must design as well as produce these dies," Mr. Miller states. "Very few customers furnish us with blueprints covering the dies they want."

To further emphasize his point that the punch press could produce economically, Mr. Miller produced a small, two-inch length of No. 302 stainless steel tubing of 0.050-inch wall thickness. An elongated hole was punched in both sides of the tube. "The firm we make these for was formerly milling the holes at a cost of about 30 cents per tube. When we accepted the production contract, we immediately designed and built a die that would smooth-



Barry L. Miller demonstrates an automatic eight-stage progressive die designed to produce four pronged clips at each press stroke.



Biological seal caps are produced by means of this progressive die. One of the caps is shown being held by the toolmaker.

"... production of an economical temporary die must follow a definite pattern to keep costs down."

punch the holes from the inside of the tube. We produced the first 7500 parts at a price of 14 cents each. Complete die amortization costs were included in the original order. From now on we will punch the tubes at a cost of 6 cents each to our customer — a saving of 24 cents per tube over the original milling costs."

Temporary tooling for the punch press is another cost-saving feature generally overlooked by the small shop owner, Mr. Miller says. When a production order will not amortize

the cost of conventional dies, short-run dies can often be designed to produce a limited number of parts at a considerable saving over milling or drilling costs.

Mr. Miller points out that production of an economical temporary die must follow a definite pattern to keep costs down. The selection of temporary die materials must be guided by the wear they will be subjected to during their limited use. Choosing materials that will outlast the use of the die only adds to the cost. Methods of temporary die fab-



Die used to produce electronic box covers. This die progressively notches, pierces, extrudes holes and then folds covers to shape.



Operator is shown filing a die component on a band saw, which has been found to be an ideal tool for performing this task.

rication must be considered. Reducing the number of operations required to produce the die reduces costs proportionally. Most shops have a number of obsolete dies in their toolrooms. A complete catalog should be kept on these dies for reference purposes. Very often, during the construction of a temporary tool, components from these obsolete dies can be readily worked into the new tool with a minimum of low-cost conversion.

The shop equipment at the Barry L. Miller Engineering Company was specifically selected in both size and type to facilitate specialized die production. Versatility and ease of setup were given major consideration. The principal pieces of shop

equipment include a Brown & Sharpe and a Boyar-Schultz surface grinder, two vertical mills — a Bridgeport and a Fray — three Niagara presses of 18, 22, and 40-ton capacity, a Hardinge speed lathe, a 15-inch Regal-LeBlond lathe, a combination DoAll band saw and file, and a 20-inch Shaper.

While a major portion of shop time is given over to the production of dies for outside concerns, Mr. Miller says that in-shop production is on the increase. His contention that the punch press is a sadly neglected tool and is capable of much more than is usually expected from it is well illustrated in this production work. Most of the work is accomplished using company-de-

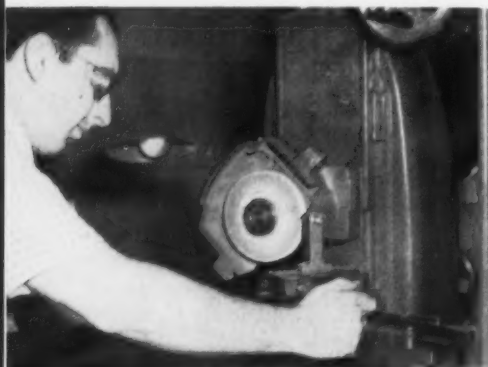


Operator at Barry L. Miller Engineering Company is shown milling a component for a progressive die on a small vertical mill.



Typical temporary die made from obsolete dies. Often low-cost alteration of obsolete die will produce adequate die for limited runs.

"... avoided the high costs of draw die production by designing a simple set of forming dies ..."



Precision is necessary in making progressive dies. Here radius and angle dresser is being used to adjust wheel on small surface grinder.

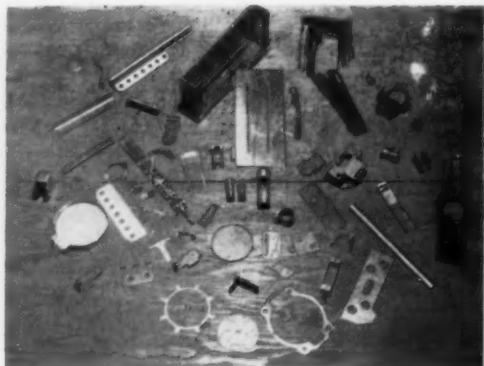


Illustration showing typical components produced in the shops of the Barry L. Miller Engineering Company using progressive dies.

signed high-speed repetitive punch press die installations on one of the three presses.

One continuous production job is punching specialized pronged clips from strip stock. The die used to accomplish this work was company-designed and built. It is designed to feed automatically in both directions at once, and is fully controlled by microswitches for automatic tool protection. With this die, each punch press stroke produces four parts. Another specialized die is used to produce the stainless steel "applier" used with these specialized clips.

Another steady production job is the making of small aluminum electronic box covers. The shape of this cover indicates immediately that most tooling engineers would

have considered it as a deep draw job with no alternative technique. Miller avoided the high costs of draw die production by designing a simple set of forming dies which produce the box cover in two press operations. The first press operation progressively notches, pierces, extrudes the holes, and folds and forms the sides of the cover. A simple closing die is used for the second operation which folds the ends of the cover into place. The folded design of this little electronic box cover is just as effective as would be a costly deep draw design because the part is non-stressed during use.

Punch press operations like this, performed at a fraction of the cost that would be involved in alternative techniques, bears out Mr. Miller's claim that the punch press

is a highly versatile machine when properly tooled, especially when tooled with well designed progressive dies.

★ ★ ★

Dynamics of Machinery. By A. R. Holowenko. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 464 pages. Illustrated. Cloth binding, board covers. Price, \$7.50.

This book is an easy-to-read, informative guide to a complete understanding of problems of dynamics in any machine in which there are moving parts. This comprehensive approach starts with velocity analysis, leading to dynamic analysis. Dynamic analysis is presented with separate or combined static and inertia force analyses and the interpretation of the separate force analysis. The basis of the study is Newton's laws, the relative velocity equation and the relative acceleration equa-

tion. The latter two are set forth in several ways so that their significance may be fully realized.

The book is outstanding for its clear and logical development of proofs and its abundance of illustrations. A significant departure — planned to overcome the difficulty often encountered when a final polygon is presented without the intermediate steps — is a breakdown of analyses into parts, showing a step-by-step construction, with final results presented only after the steps have been discussed and explained in a series of isolated figures. In the development of relations, the author has carefully used both analytical and graphical proofs when one supplements the other. The relationship of equations to graphical solutions is clearly explained. Another factor of great value is the constant use of free body diagrams. Problems, carefully graded in difficulty, accompany each chapter of the book.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Spare Time Turned Into Production Time

A way to turn spare time into production time was found at J. I. Case Co., Racine, Wis., by mounting two Delta 17-inch drill press heads, columns and flanges on top of a broaching machine. While the broaching machine completes the broaching of a main bearing block, the operator drills and reams two $\frac{5}{8}$ -inch locating holes in the pan rail of a motor block. Thus, the operator makes use of what is otherwise idle waiting time.

For more data circle 2 on Reader Service Card

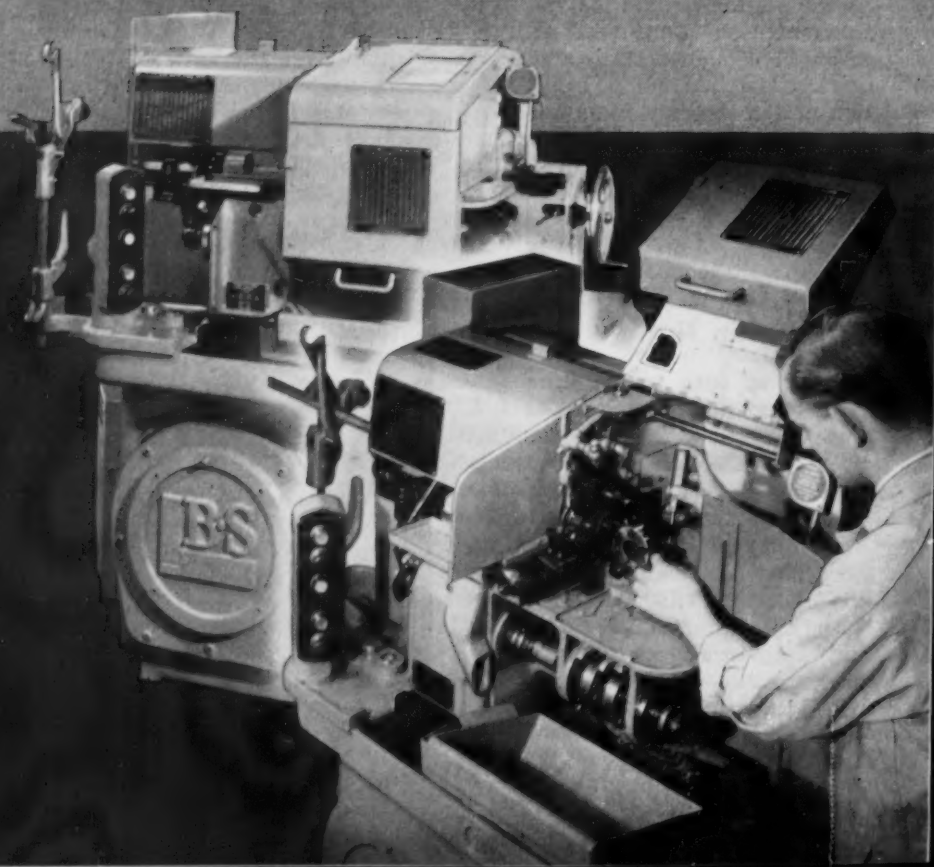


New Automatic Produces Parts Faster

A description of the features of the new No. 00 which provide for faster production and increased accuracy.

By W. S. SIZER

Director of Design for Machine Tools,
Brown & Sharpe Mfg. Co., Providence, R. I.



The Brown & Sharpe Automatic has long been universally known as one of America's outstanding machines for the fast, accurate production of a wide variety of small turned parts. Through many years of evolution, the No. 00 developed into the productive machine with which many are familiar. Some time ago, our management decided to have our engineers work out their concept of the better, faster automatic of the future. They were instructed, "You may develop and improve but must not lose the set-up convenience, the accurate cutting ability, or the aluminum-to-stainless versatility of the current machine." With this admonition and a clean sheet of paper, the design for this machine was started. From the floor up it is a new machine and it is the purpose of this article to describe the features which make it new.

A one-piece base has great rigidity and gives good support to the machine bed. Within the base are housed the main motor and the spindle driving mechanism. Electrical controls are housed in a single semi-dust tight compartment which conforms to the Machine Tool Builders and J.I.C. standards. The door handle throws the disconnect switch. A transformer limits control voltage to 110 volts.

Fast cutting requires a hurricane flood of cutting oil. To keep the spray within bounds we have more complete guarding. Plastic windows (skylights) are located in the sloping roof sections of the guards and a fluorescent light is available to flood light into the cutting zone.

The vertical slide included as standard equipment is a simple slide

designed to carry straight cutting-off blades and is actuated by a cam located at the front left of the machine. Both the cross slides and the cross slide ways are made of case-hardening steel, carburized 1/32 inch deep and hardened to 85 scleroscope, and have ground way surfaces. The slide way or supporting base for the turret slide is a hardened and ground steel member. The turret slide is cast iron.

The benefits of automatic lubrication have been extended in this machine. It has 42 points which receive direct lubrication; its predecessor had 28. Several of the new points are in the turret slide where ways, intermediate gear, clutch, and plunger receive oil. In addition to the distributing line system, there is a splash system which lubricates the spindle chains and driving mechanism.

This machine has a top speed of 7,200 r.p.m. A ball-bearing spindle has been adopted in this machine. We like the feature that a set of ball bearings can be made with no clearance or with a specified amount of preload and that this is inherent in the bearings and is not subject to adjustment made by operators or maintenance men.

Roller chains give positive drives to both spindle sprockets and to the drive shaft. For the high-speed spindle drive, we use a 1/4 pitch, triple roller chain. At high speeds (6,450 ft./min. in this case) the most serious forces to which a chain is subjected are the impact forces which occur as approaching rollers strike the sprocket teeth. These impact forces are best controlled by fine chain pitches and large numbers of

"The largest diameter stock which can be handled by this machine is $\frac{1}{2}$ inch."

sprocket teeth. We began testing the newly developed $\frac{1}{4}$ pitch chain in 1950 and have now worked out a drive which easily passes our minimum requirement of a life of 2,000 hours, running on a 3-second cycle with speed being reversed from 7,200 to 1,400 and back to 7,200 for each cycle.

The cone clutch on the spindle must handle more energy as speed goes up. We have thus increased the diameter of the cones to better handle this energy and are now mounting the plastic cones on a steel shell to limit expansion due to temperature change.

For all our high speeds and free machining, we still must handle tough stainless steels and materials

difficult to thread. To take care of these extremes, we have increased the number of spindle speeds and have gone to lower values. Eighteen high-range speeds, 450 to 7,200 r.p.m. replace 16 which gave 550 to 6,000 r.p.m. High-Low ratio gears of 16:1 give a lowest speed of 34 r.p.m. where in the past a 13:1 ratio gave a low of 50 r.p.m.

If chips are to be made faster, where are they to be stored? The opening in the bed, the throat through which the chips fall, has been doubled in area. The front right corner of the machine is exposed and a steel chip pan having an area equal to about half the floor area of the machine is located between the bed and the base. Chips can be removed from the end of the machine.

In this new machine we have increased the axial turning capacity 33 per cent or have replaced a $\frac{3}{4}$ -inch length with a 1-inch length. On extra-capacity (120 r.p.m. back-shaft) setups, a $1\frac{1}{2}$ -inch value replaces a $1\frac{1}{4}$ -inch value. Since the top speed of a No. 0 machine is 4,200 r.p.m., we can by using a 7,200—No. 00 machine, get a 70 per cent increase in speed.

The largest diameter stock which can be handled by this machine is $\frac{1}{2}$ inch. Several of our screw machine tools (balance turning tool for example) have been redesigned to handle this full $\frac{1}{2}$ -inch capacity. In addition, the turret slide wall has been located to provide slightly



Operator setting up new No. 00 Automatic.

greater clearance for turret tools.

A stationary coil, electro-magnetic clutch is used on the drive shaft. This permits electrical control of the machine and makes it simple to locate a jog button in the control post. In a setup where the operator may wish to move through a cycle by increments, this jog will be useful.

High speed spindle gears and the ratio gears which give the low-spindle speed are both located in the gear compartment just under the control post. Gears are stored in the door and it becomes a simple job to change gears.

Some jobs require a change in direction of high-speed spindle rotation. This is readily done with a reversing switch. Although the main motor direction is changed, the direction of drive shaft rotation must be kept constant. A pair of pick-off gears located behind the electrical compartment can be changed to new centers to maintain proper drive-shaft rotation. A mechanical linkage connected to the reverse switch handle makes it impossible to throw the switch if the pick-off gears are in improper position, or if the gears are removed from the machine makes it impossible to reassemble them in the wrong position.

These same pick-off gears can be transposed (big for little) to change drive shaft speed. Normally the shaft runs at 240 r.p.m. and causes feeding and indexing functions to be completed in $\frac{1}{4}$ second. When extra capacity for turning ($1\frac{1}{2}$ inch) is desired, the gears may be transposed and a 120 drive-shaft speed for one-half second functions obtained.

The turret slide can be adjusted forward by $\frac{1}{4}$ inch or backward by $\frac{1}{2}$ inch. This adjustment can be used to obtain a convenient mean position for all turret tools or an exact position for one tool. It also permits easy accommodation of old sets of cams (5 inch diameter).

During setup, the operator often moves through a work cycle while turning the handwheel by hand. This handwheel is supported in the feed gear case door and is clutch-engaged to the drive shaft. When so engaged, the electrical control circuit of the electro-magnetic clutch is opened and it is impossible to obtain power drive to the drive shaft. Only after disengaging the handwheel clutch can power be obtained.

Two new attachments are being offered with this machine—one attachment for cross drilling and turret milling operations and another attachment for deep-hole drilling.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



"The bus broke down on River Street."

Transmission Extensions Machined on Transfer Plate-Type Fixtures

Housings processed from rough castings to finished workpieces at the rate of 150 per hour.

Before the acquisition of a W. F. and John Barnes special 10-station progress-thru-machine, a leading automobile manufacturer processed transmission extensions on 17 separate machines. Now, the same job of processing the housings from rough casting to finished workpiece ready

for assembly is done on the single machine shown in Fig. 1. Operations include boring, counterboring, facing, milling, drilling, reaming, and automatic press-in of babbitt bushings into the housings. All elements are automatically interlocked to provide a production of 150 pieces per hour.

In operation, rough housings are located and accurately positioned two at a time on transfer plates which carry the workpieces through the entire machining cycle. Parts are clamped and unclamped on the transfer plates by a power wrench. The machine is provided with 14 transfer plates which are pushed from station to station by one short pusher bar at approximately 970 inches per minute. The plates are located in fixtures at each machining station by means of two hydraulically actuated dowels and are clamped hydraulically.

Total concentricity on all operations is held within 0.002 inch. Machining sequence and operations performed on the small ends of the housings (Fig. 2) are as follows: Station 1—Load; Station 2—Com-

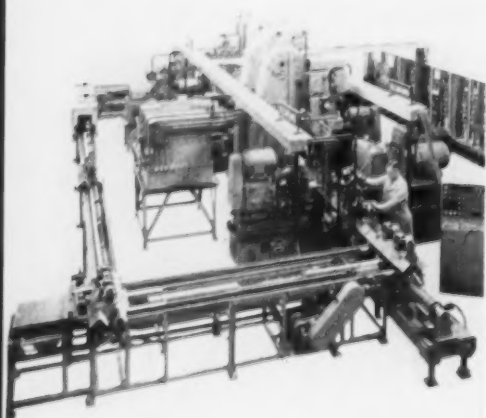


Fig. 1—Overall view of Barnes Special 10-Station Progress-Thru Machine, showing operator of the machine's loading station. Note transfer plates turning from the unloading station to the loading station of the machine.

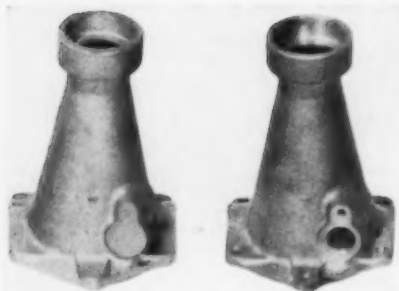


Fig. 2—Illustration showing transmission extension housing before and after performing machining operations on the small end.



Fig. 3—Illustration showing transmission extension housing before and after performing machining operations on the large end.

bination rough and finish bore. 1.6245-inch diameter, rough bore 2.376-inch diameter, chamfer both diameters and face end; Station 3—Drill through for 0.878-inch diameter and spot drill center of thrust pad (speedometer hole); Station 4—Spotface outer boss; Station 5—Idle; Station 6—Combination drill and chamfer for $\frac{1}{4}$ -20 tap, combination finish bore 1.6245/1.6255-inch diameter, and semi-finish bore for 2.376-inch diameter; Station 7—Automatically press in bushings; Station 8—Combination finish bore babbitt bushing to 1.504/1.506-inch diameter and finish counterbore to 2.376/2.387-inch diameter; Station 9—Idle; and Station 10—Unload.

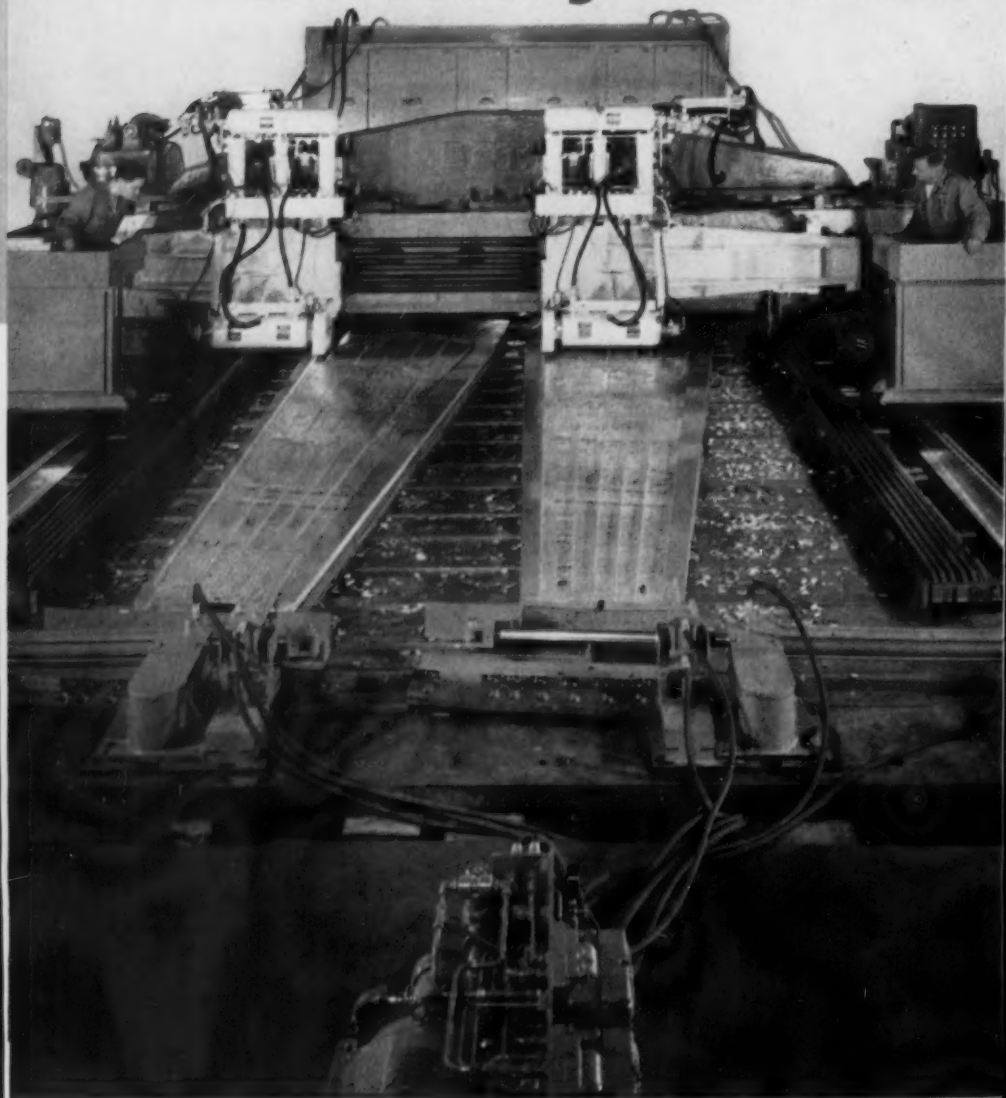
Machining sequence and operations performed on the large ends of the housings (Fig. 3) are as follows: Station 1—Load; Station 2—Combination rough hollow mill for 4.5195-inch diameter and rough face end and flange; Station 3—Idle; Station 4— $\frac{13}{32}$ -inch drill through flange holes; Station 5—Combination semi-finish ream for 0.878-inch diameter, (end cut) chamfer 0.96-

inch diameter x 30 degrees and spot-face 0.44-inch diameter boss; Station 6—Combination semi-finish hollow mill for 4.5195-inch diameter and chamfer and semi-finish face flange; Station 7—Tap speedometer boss; Station 8—Finish hollow mill 4.5195/4.5175-inch diameter and feed-out face flange with same tool; Station 9—Finish ream 0.878/0.880-inch diameter speedometer hole; and Station 10—Unload.

At Station No. 7, babbitt bushings are automatically pressed into the small end of the extension housings. A second operator who stands at Station No. 10 unloads the finished workpieces and manually loads a hopper with the bushings which are carried to Station No. 7 for insertion into the housings.

After finished workpieces have been unloaded from the transfer plates at the unloading station, they are conveyed to a washer and on to inspection and assembly. A two-speed return transfer conveyor, shown at far left in Fig. 1, returns the transfer plates to the loading station of the machine.

Machining One-Piece



Overall view of 225-ton skin mill completed for North American Aviation by Simmons Machine Tool Corp. Albany, N. Y., shows two

aluminum alloy slabs being machined simultaneously to form integrally-stiffened wing sections for F-100 Super-Sabre Jet airplanes.

Aircraft Wing Panels

Huge "skin mill" extends automation to manufacturing of one-piece jet aircraft wing panels.

A huge, 450,000-pound machine called a "skin mill," was completed recently by the Simmons Machine Tool Corp., Albany, N. Y., and shipped to the North American Aviation Company of Los Angeles where it will be used for sculpturing, in one piece, wing panels for the F-100 Super-Sabre Jet. The machine is designed to drastically cut machining time by performing in three hours and fifteen minutes an operation that formerly required 60 hours.

The skin mill is a conversion; in building the modern, electrically and hydraulically-controlled machine, the basic portion of a 13-year-old pit planer was used, affording savings in cost and building time.

Although as delivered to North American Aviation, the machine will sculpture two integrally stiffened wing panels simultaneously, it also provides for the addition of tooling to machine as many as five leading edge skins placed on five separate vacuum chucks. The configuration of these skins requires rise and fall and diagonal operation of two cutting heads for duplicating templates. **Longitudinal cutting speeds** vary from 20 to 150 inches per minute in both directions. Transverse cutting feeds vary from 5 to 62 inches per minute. Diagonal cutting is provided, necessitating accurate coordination of longitudinal and cross feeds.

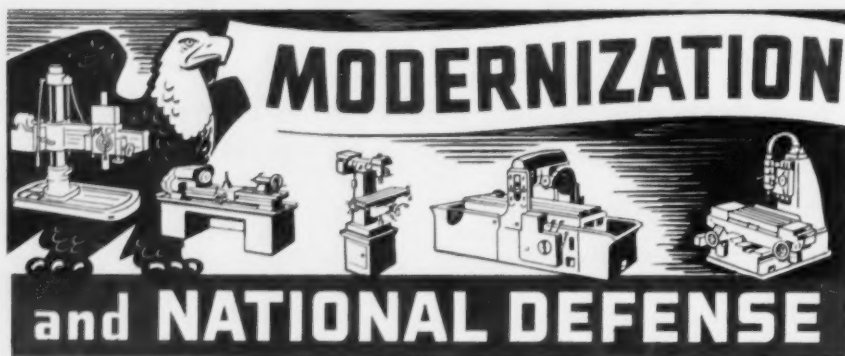
A cross-slide indexing device is provided for visual inspection plus

automatic locating of cutting tools. Accuracy requirements are held as close as plus or minus 0.001 inch. The rise and fall of the cutter heads are hydraulically controlled by a tracer. Outstanding features of the machine include two consoles with banks of push-button stations comprising 60 individual controls.

The Simmons Skin Mill is 12 feet high x 25 feet wide x 30 feet long. Flexibility of operation with two feed systems is obtained with a combination of electrical and hydraulic controls. A vertical rise-and-fall cutting action controls variation in thickness. Each of the two milling heads is powered by a 60 h.p. motor. Spindle speeds up to 3,600 r.p.m. permit removal of as much as 250 cubic inches of metal per minute.



Operators ride in pulpits mounted on the traveling rail, before consoles with banks of push-button stations having 60 individual controls.



Survival in a competitive economy and survival in national defense depend upon the installation of modern machine tools.

By RALPH S. HOWE

President, The New Britain Machine Company
and Chairman, Sub-Committee on Permanent
Defense Capacity, N.M.T.B.A.

The Machine Tool Show to be held in Chicago in September, under the auspices of the National Machine Tool Builders' Association, brings to a focus the entire subject of the relationship between plant modernization and national defense. Machine tools are essential, directly or indirectly, to the manufacture of every single product used for war or defense—just as they are equally essential to the manufacture of practically every peace-time product which is part and parcel of our present-day industrial civilization.

It is impossible to weigh national defense potentialities without consideration of machine tool potentialities. No matter how many advances are made in the design and development of the weapons of war, *they*

cannot be translated into actual equipment except by the performance of machine tools.

The nation's machine tool capacity, and rate of progress in cutting and forming metal, becomes therefore a major item of concern with respect to national defense. Never has the machine tool industry made such rapid strides in the advancement of the art of removing and shaping metal as it has made in the last few years.

At the Chicago Machine Tool Show, over 140 machine tool building companies will display their latest models in the largest exhibit of machine tools ever to be held under one roof. There will be a total floor area of 428,000 sq. ft. devoted to showing manufacturers in the metal-

working field how they can cut production costs and get greater productivity per man per hour.

Just what bearing does this have on national defense? What action is indicated, both for defense authorities and for the individual manufacturer engaged in the metalworking field?

Government Policy

Before I attempt to answer these questions, let me summarize briefly my understanding of current government policy with respect to machine tools on behalf of national defense—which is, I might add, the first constructive policy which has emerged out of the succession of national emergencies in our entire history.

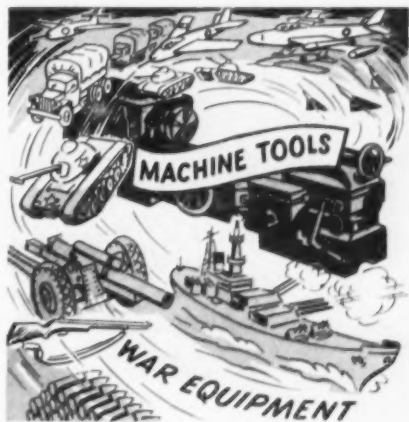
At the end of World War II, although the machine tool industry had been asked to do an almost super-human job on behalf of national defense and had built up a great supply of machines useful for this purpose, *the government immediately, upon the end of the war, sold these machines in the open market as "government surplus."* This had three destructive results; namely, (1) it reduced the number of machine tools that our Defense Department would have available in time of another emergency; (2) the competition of government-owned machine tools forced the machine tool industry to well nigh depression levels; and (3) the competition resulting from this irresponsible disposal of tools, plus renegotiation of so-called excess profits, in some instances, left several builders with inadequate resources to weather the depression of 1947-49, which contributed to the liquidation or sale of

more than 50 machine tool builders.

Next came the Korean emergency, when the mistakes of this policy became evident. Once more the machine tool industry was asked to achieve incredible levels of production for national defense. But at the conclusion of that emergency, the lessons learned were carefully considered, and the outcome was a new governmental policy, known as the Vance Report, based upon recommendations of the Advisory Committee on Production Equipment of the Office of Defense Mobilization. This policy may be very briefly summarized as follows:

Machine tools acquired by the government on behalf of national defense, which may still be useful for that particular purpose, shall be retained by the government in a reserve of production capacity.

The government will place orders for certain types of large machine tools, requiring in



"... they cannot be translated into actual equipment except by . . . machine tools."

"... our defense authorities are today acutely aware of what machine tools are and what they do."

some cases up to two years for their manufacture, needed for certain phases of defense production in quantities beyond normal civilian demand.

The government should maintain a consistent program of replacing obsolete government-owned machine tools by new and more efficient models, plus the purchase of such new machines as are required to give the country an adequate mobilization base.

This enlightened government policy contrasts sharply with that which obtained during World War II. At that time there was one important defense official in Washington who stated that machine tools were no more vital to national defense than pots and pans, and ap-



"... the government immediately ... sold these machines as 'government surplus'."

parently thought they were as readily available. Fortunately, our defense authorities are today acutely aware of what machine tools are, and what they do. But can government alone defend the United States?

The Responsibility of the Individual Manufacturer

What happens in the event of a national emergency?

The machine tool reserve retained by the government is a vital bulwark; but the production potentialities of this reserve would be merely a drop in the bucket by comparison to the demands of all-out war.

In such event *every* metal-cutting and metal-forming plant in the country has to go to work for defense. How well are these plants equipped today?

The answer is one which the executives of many such companies should hesitate to submit to our defense authorities. The answer is, as a matter of actual fact, that the majority of the metal-cutting and forming equipment in the industrial plants of the United States is obsolete; and that if these plants were called upon tomorrow for maximum output, they could not perform to capacity because a large share of their equipment is antiquated by comparison with today's models, and could not turn out the volume required by a national emergency.

The proof may be seen in the Machine Tool Show to be held in Chicago in September.



Bellows COLLET CONTROLLER

low-cost automatic stock-holding for hollow-spindle lathes and other rotating spindle machines.

- ★ never stop the machine
- ★ stock will NOT Slip
- ★ operate manually or automatically

Take a critical look at your methods of loading and holding work. Are they eating into profit margins by robbing you of valuable machine time? The fractions of seconds wasted while stock is positioned, while collets and holding fixtures are set and reset, total up to an alarming theft of productivity.

The Bellows Collet Controller, powered by a special aluminum non-rotating air cylinder, opens and closes collets faster than the eye can follow. It can be pushbutton controlled or interlocked with other machine elements for automatic operation. The spindle motor of the machine need never be stopped. Holding pressures are always uniform (25 times air pressure applied). Clamping is instantaneous and positive. Mounting is easy. And cost is low.

FOR FULL INFORMATION

Write for

BULLETIN BC-60

ADDRESS DEPT. MMS 855

The Bellows co.

AKRON 9, OHIO

CONTROLLED-AIR-POWER FOR FASTER,
SAFER, BETTER PRODUCTION

For more data circle 353 on Reader Service Card

August, 1955

modern machine shop 131

"... improvements in metal-cutting ... will show American industry how it can be ready for an emergency ..."

How Serious Is the Factor of Obsolescence?

It is very serious. This may not be generally realized because a good many people do not understand the sequence of events which have led to the present situation.

At the beginning of World War II, when the machine tool industry was suddenly called upon for production beyond all previous experience, machine tool models were frozen to the designs that obtained at the beginning of the war, or earlier. There was no time to change designs.

At the end of World War II, the machine tool industry was plunged into a depression resulting largely from the competition of "government surplus" machine tools, and did not have the financial resources to push research and design to such a point as to bring to market at that time new models which would exemplify latest potentialities.

Then came the Korean crisis, and again the industry was plunged into a situation of maximum production of existing models. It has only been since Korea that the machine tool industry has been able to develop, in actual models ready for sale, the full benefits of research and of the development of ideas which have long been generating.

The improvements in metal-cutting and forming technology on display at the Machine Tool Show in Chicago will show manufacturers how they can cut production costs

and maintain their position in today's competitive markets. But they will do far more than that. They will show American industry how it can be ready for a national emergency, in case one should arise.

Preparedness for Defense Work

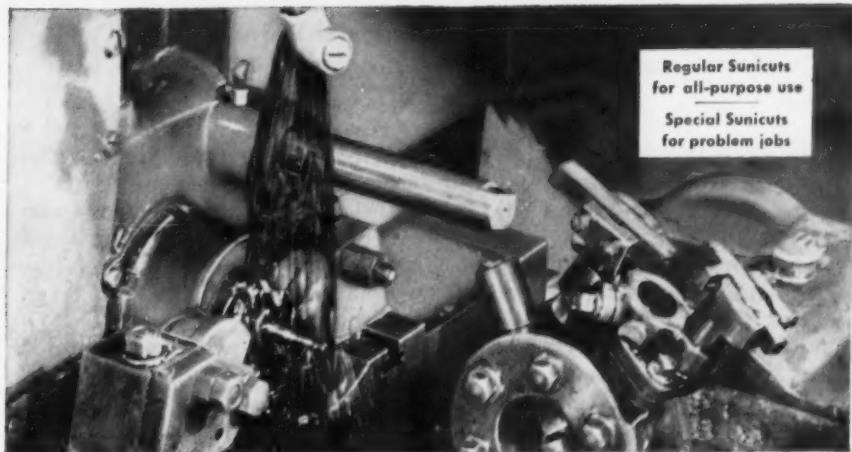
Suppose tomorrow we would get into real international trouble. Suppose we would immediately have to re-arm, on a large scale.

The national machine tool reserve, and other procedures implemented under the Vance Plan, as described above, would help. But that wouldn't be enough. Directly or indirectly, your particular plant would inevitably be involved.

Is the equipment in your plant today able to take care of such a potential demand tomorrow? This isn't



"The answer is one which executives should hesitate to submit to our authorities."



Regular Sunicuts
for all-purpose use

Special Sunicuts
for problem jobs

To assure peak production . . .

THERE'S A SUNICUT OIL FOR EVERY SCREW MACHINE OPERATION

Today's Sunicut cutting oils result from years of research and on-the-job testing. And they're versatile, too. In many plants *all* screw machine jobs are handled by *one* Sunicut grade.

For the problem jobs, Sun makes a wide variety of special Sunicut oils, each designed to do the job better.

Your Sun representative has the practical know-how to analyze *your* problems. With Sun's experienced engineers, he's ready

to help you pick a Sunicut oil that will give you tolerances and finishes you want.

The Sunicut series for screw machines is only part of a large selection of non-emulsifying and emulsifying cutting oils made to help you get peak production at the lowest possible cost.

For complete information about Sun cutting oils see your Sun representative...or write Sun Oil Company, Philadelphia 3, Pa., Dept. MM-8.



INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY
Philadelphia 3, Pa.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

For more data circle 354 on Reader Service Card

August, 1955

modern machine shop 133

"Never has there been such a rapid demonstrated advance in the art of removing and shaping metal . . ."

simply a hypothetical question. This is a question which involves the safety of everybody in the United States.

As I have said before, the strength of the United States, in the event of a national emergency, lies in its production potential. Its production potential depends primarily upon machine tools. It is this potential, in the light of latest models, that will be demonstrated at the forthcoming Machine Tool Show in Chicago in September.

Who Should Visit the Machine Tool Show?

Obviously, executives of companies engaged in manufacturing having to do with the cutting and shaping of metal should visit the Machine

Tool Show. But the officers of the various branches of the United States Department of Defense who are concerned with procurement and problems of manufacture of the weapons of war should also be at this show.

Never has there been such a rapid demonstrated advance in the art of removing and shaping metal within a period of a few years as will be demonstrated at the Machine Tool Show by the developments which have actually been perfected since the end of the Korean emergency and September of 1955. *Every Air Force, Army and Navy officer interested in reducing the cost of defense equipment—as well as every manufacturer of civilian goods concerned with reducing "cost per piece produced" to meet competition—should visit this Show.*

Every metalworking and metal-forming plant in our country, as I have previously pointed out, is a potential receiver of a national defense contract in time of emergency. Meanwhile every metalworking and metal-forming plant in our country is likewise subject to the operation of the competitive principle upon which our national economy is founded.

The survival factor in a competitive economy is chiefly that of cutting costs. A major survival factor in national defense is that of maximum productivity. Both of these factors depend upon the installation of modern machine tools.



"Every Air Force, Army and Navy officer . . . as well as every manufacturer of civilian goods . . . should visit this show."

Try these lightweight...speedy PORTABLE TOOLS

● Produced in the industry's most modern, air-conditioned plant to give you *top precision*.

● Gives you advanced features for *faster production, easier handling*.

● Backed by Rotor Tool's 25-year reputation for applying the *right tool for your job*.

Ask for a demonstration of any of these tools.

See how they can cut your costs!

Special bulletins on all tools on request.



Vertical Sanders



Angle Drills



Vertical Grinders



Chippers



Midget Grinders



Die Grinders



Scaling Hammers



Cone Grinders



Buffers



Straight Grinders



High Cycle Tools



Rammers

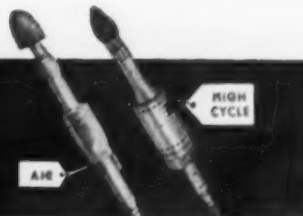


Screw Drivers

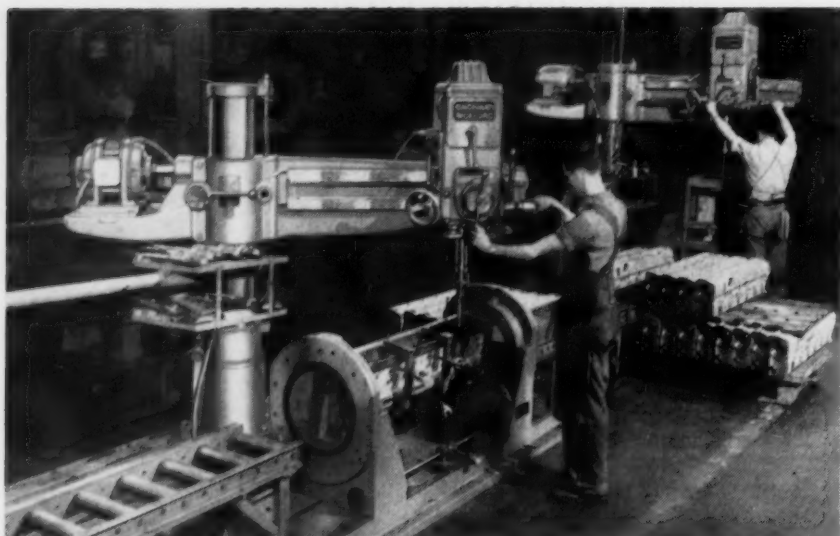
ASK FOR BULLETIN 43

THE **ROTOR TOOL** CO.
CLEVELAND OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



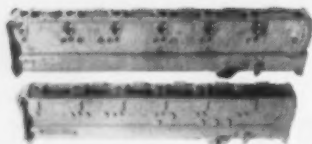
For more data circle 355 on Reader Service Card



**3 years of operation
with NO MAJOR
MAINTENANCE...**



Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.



Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

The performance of Cincinnati Bickford Super Service Radial Drills at Caterpillar Tractor Co. has been outstanding, steady and trouble free.

On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005" tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

Write for Catalog R-21-C.



BOOTH 901

50 YEARS OF SERVICE

**CINCINNATI
BICKFORD**

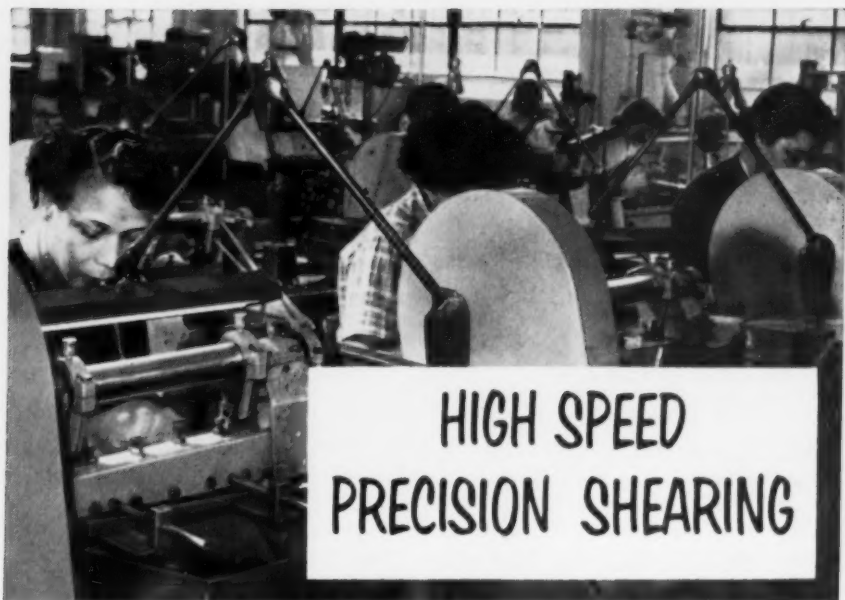


RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

For more data circle 356 on Reader Service Card



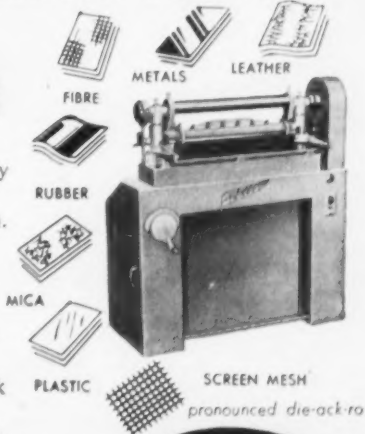
HIGH SPEED PRECISION SHEARING

Production shearing of nickel sintered plates to $\pm .010''$ at Sonotone Corp.

DI-ACRO POWER SHEAR

COAST TO COAST FAVORITE FOR—

- **PRECISION**—strips less than .025" wide accurately sheared, parts exactly duplicated.
- **CUTTING SPEED**—from 30 to 200 strokes per min. Continuous and single stroke operation.
- **CAPACITY**—16 gauge sheet steel.
- **SIMPLICITY**—no experience needed to operate.
- **RUGGED CONSTRUCTION**—backed by warranty.
- **SELECTION**—four models, immediate delivery.
- **ECONOMY**—price and operating costs are rock bottom.
- **ENGINEERING SERVICE**—always at your disposal.



SEND FOR SHEAR MANUAL

Sixteen pages of helpful information to aid you in selection of machines for your shearing operations. It's free—write today.

O'NEIL-IRWIN MFG. CO., 306 8th Ave., Lake City, Minn.

See 2 Di-Acro Exhibits at Chicago Sept. 6-16
Production Eng. Show, BOOTH 125-126, Navy Pier
Metalworking Show, BOOTH 653, Chicago Coliseum

di-acro
PRECISION
METALWORKING
MACHINES

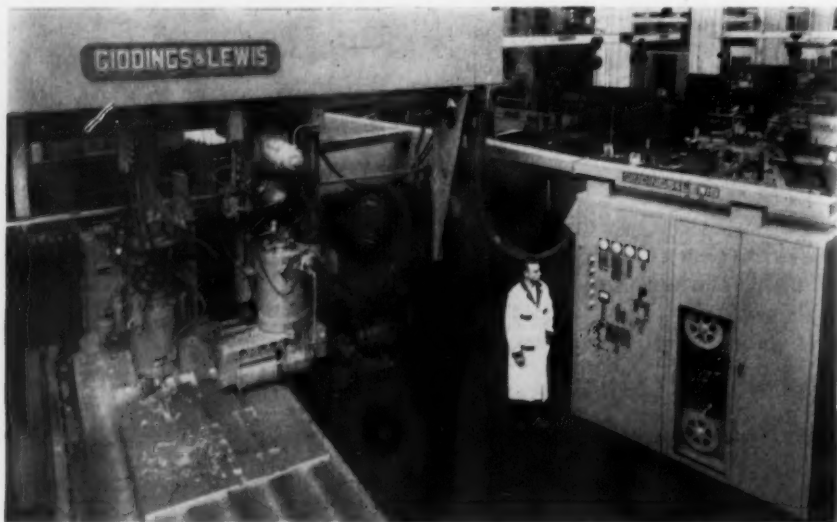
Tape-Automated Machining

This article describes the new Giddings & Lewis Numericord system which automates machine tools for production of precision parts from numerical data.

Milling intricately-contoured, low-tolerance workpieces on multi-axis machines completely controlled by magnetic tape—on which entire work cycles have been programmed solely from numerical data—was proved a present-day production reality by the Giddings & Lew-

is Machine Tool Company in a recent demonstration of its revolutionary Numericord control system operating a skin milling machine at the company's Fond du Lac, Wisconsin, plants.

With this system, machining cycles involving as many as five



"Plunge," "channel" and "pocket" milling cuts are performed by means of this spar and skin milling machine under complete control of a numerically-prepared magnetic program tape.

machine axes and 22 auxiliary machine functions are completely planned and engineered by mathematical computation. Pre-calculated data, in normal decimal numerical form, are processed by the system's exclusive "electronic brain" computing director into continuous phase-modulated command signals, automatically recorded on magnetic tape. This "magnetic memory" tape is electronically read in the machine control unit to operate minute-current-response, wide range amplidyne servo mechanisms which perform all feed and traverse functions automatically—repeating tirelessly and accurately the entire machining program for producing identical parts in any quantity, to tolerances limited only by the machine tool—ordinarily ranging plus or minus 0.001 inch to 0.002 inch.

While applicable to virtually any machine tool, the new Numeri-cord system was demonstrated at Giddings & Lewis in control of one of the company's aircraft-type spar and skin milling machines performing all "plunge," "channel," "pocket" and contouring cuts necessary to mill complete jet plane skin and wing panels from solid 75 ST aluminum plate.

One of the outstanding advantages of the system is its ability to "store" skills. Master tapes covering all parts of prototype planes or other military items can be stored in safe locations waiting an emergency order for all-out production. Even more important, such vital production can be transferred from one plant to another, in a matter of hours, by this method of "storing" skills on magnetic tape.

A novel, yet nonetheless practical, advantage of this system is the ease with which audio signals can be included in the magnetic tape. These can be used to alert the machine attendant to up-coming tool changes and "planned stop" machine inspection periods.

The new system provides another unique advantage in its complete physical separation of numerical-tape-preparation and machine-control components. Thus, tapes can be prepared on a continuous production basis for all machines and jobs in the shop. Files of magnetic tapes can be maintained ready for changing any machine's production from one part to another without loss of time. Even part design modifications can be processed on tape ready for later production change-over.

Four major components make up

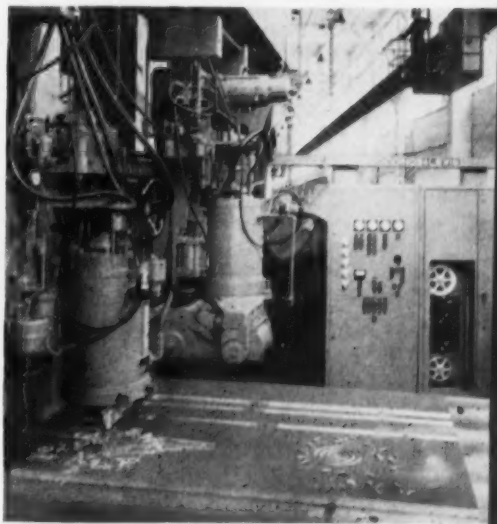


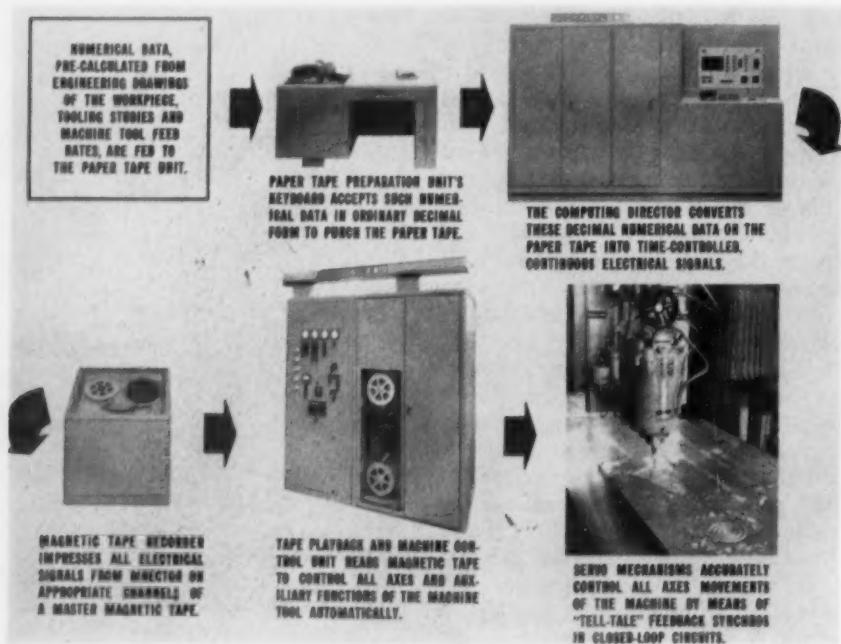
Illustration showing close-up view of Numeri-cord-controlled spar and skin miller in use.

"... the Numericord system is simple, practically foolproof and extremely flexible."

the Numericord system: (1) a paper tape preparation unit, which punches a master numerical tape with previously-calculated decimal information from part drawings, tooling data and machine feed rates; (2) an electronic computing director, which converts digital information on the paper tape into phase-modulated, time-coordinated command signals recorded on proper parallel channels of a magnetic tape; (3) electronic play-back circuitry, which reads commands off the magnetic tape and sends appropriate

electrical control signals to the machine; (4) electro-mechanical, machine-control units which operate in closed-loop-feedback, phase-shift, synchro-servo systems to position machine axes in accordance with taped command signals. Machine auxiliary functions and non-feed controls are operated automatically through relay circuits from simultaneous command impulses on other parallel tape channels.

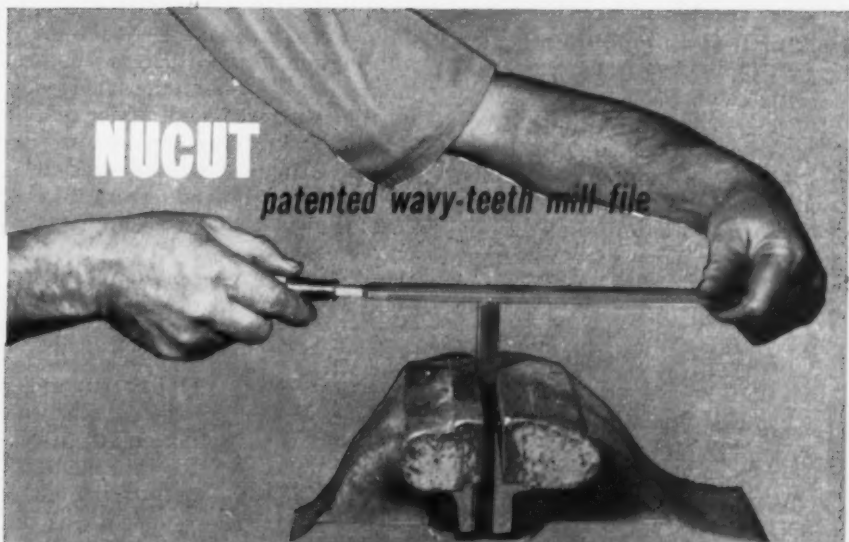
Operation of the Numericord system is simple, practically foolproof and extremely flexible. To pre-



Main components of the new Giddings & Lewis Numericord System of Machine Tool Automation.

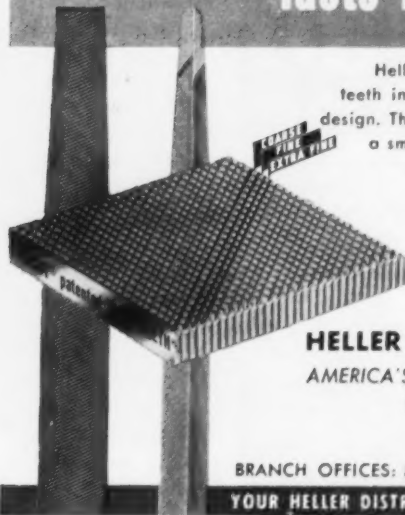
NUCUT

patented wavy-teeth mill file



costs no more *than an ordinary file*

but it lasts longer—cuts faster



Heller NUCUT files combine coarse, fine and extra fine teeth in a planned irregularity, creating the "wavy-teeth" design. The coarse teeth cut deep, clean; the fine teeth leave a smooth, scratch-free finish. This "Wavy-Teeth" design makes the file clear itself, adds longer life. NUCUT "wavy-teeth" files cut faster without scraping or chattering. Ask your distributor for Heller "NUCUT files with patented "wavy-teeth."

VIXEN American-Swiss NUCUT

FAMOUS BRANDS MADE ONLY BY

HELLER BROTHERS COMPANY

AMERICA'S OLDEST FILE MANUFACTURER

Newcomerstown, Ohio



BRANCH OFFICES: New York Chicago Detroit

A NEW JERSEY CORP.

YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

For more data circle 358 on Reader Service Card

" 'Stop' codes . . . provide intervals for tool examination . . . "

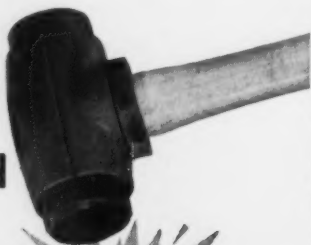
pare a master paper tape, the operator merely enters previously-calculated decimal increments of desired machine axes motions and time intervals on the paper tape unit's keyboard. No conversion into usual bi-

nary code form is necessary as the unit accepts ordinary decimal digital information. Special commands are entered on the tape in the same fashion by using six auxiliary symbols supplied. Checking circuits in the unit operate automatically to determine such command errors as exceeding feed rates or time intervals chosen, missing "plus" or "minus" signs, wrong number of digits in any

command and improper least significant digit. Other supervisory circuits examine all data fed into the unit, perforating additional holes in the paper tape for logical control of the system's electronic director unit.

"Stop" codes placed in the paper tape sequence provide intervals for tool examination and replacement as well as for checking settings of machine verniers. Thus, interruption of a machining program by tool breakage merely requires return to the first previous "stop" signal, retooling and restarting of the machine-

**LESS
REBOUND**
per pound
thanks to
"Contact Control"



C/R Jawhead
the best "soft" hammer you can buy!

Special processing controls the rebound for longer striking contact. This means more work with fewer blows, less fatigue. Faces won't mar surfaces, slip, chip, fly off or change with extreme temperatures or use. Cost less, too, and last longer — are safer for work and worker.



CHANGE FACES IN SECONDS —
Threaded collar locks them in.

• Available from
your local industrial
supplier.

CHICAGO Rawhide MFG. CO.
1301 Elston Ave., Chicago 22, Ill.
In Canada: Super Oil Seal Mfg. Co., Ltd.,
Hamilton, Ontario

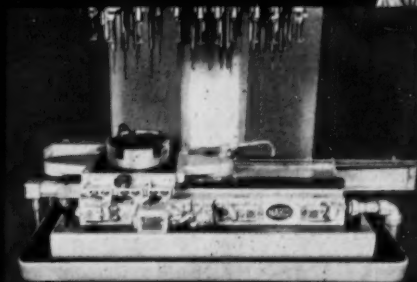
For more data circle 359 on Reader Service Card

NEW NATCO DRILLER DOES WORK OF THREE MACHINES

...DRILLS, CHAMFERS AND TAPS AUTOMATICALLY!

NATCO H-6 LIGHT SENSITIVE, ADJUSTABLE
MULTI-SPINDLE DRILLER AND TAPPER WITH...

3 POSITION AUTOMATIC FIXTURE SLIDE



THREE POSITION AUTOMATIC FIXTURE SLIDE IN DRILL POSITION



TYPICAL FEED CYCLE

POSITION No. 1—DRILL

Load Part
Rapid Traverse
Feed Forward
Feed Forward
Rapid Reverse
Index to Position No. 2

POSITION No. 2—CHAMFER

Rapid Traverse
Feed Forward
Rapid Reverse
Index to Position No. 3

POSITION No. 3—TAP

Rapid Traverse
Feed Forward
Feed Reverse
Rapid Reverse
Index to Position No. 1

NATIONAL AUTOMATIC TOOL COMPANY, INC.
RICHMOND, INDIANA

for answers to your Drilling, Boring, Facing and Tapping problems

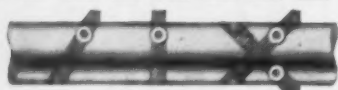
Call a Natco Field Engineer

CHICAGO, Room 203, 6429 W. North Ave., Oak Park
DETROIT, 10138 W. McNichols Rd.
BUFFALO, 1807 Elmwood Ave.
NEW YORK, 35 Breckwood Ave., Mount Vernon

THE
MACHINE TOOL
SHOW

CHICAGO, ILL.
SEPT. 8-17, 1965
INTERNATIONAL AMPHITHEATRE





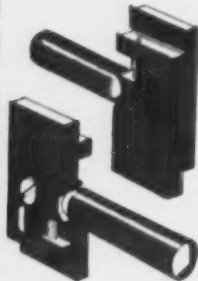
A BETTER BORING BAR

● because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from $\frac{1}{8}$ " up to and including $\frac{3}{4}$ ".

TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes $\frac{7}{8}$ " dia. up to 6".



A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots

$\frac{3}{8}$ " x $\frac{1}{8}$ "	$\frac{1}{2}$ " x $\frac{1}{8}$ "
$\frac{1}{2}$ " x $\frac{1}{8}$ "	$\frac{3}{4}$ " x $\frac{1}{8}$ "

THE DETROIT BORING BAR CO.

688 E. FORT ST.

DETROIT 26, MICH.

Established



1927

"... director reads punched paper, line for line ..."

control unit. Automatic operation resumes at that stop and continues to the end of the program, unless similarly interrupted.

It is the electronic computing "director" which processes decimal digital information, contained on the paper tape, into the phase-modulated continuous electrical signals for recording on magnetic tape. In operation, the director reads the punched paper tape, line for line, storing information thus serially presented in special magnetic-core memory units until later commands from the director release them to secondary memory units or directly to data-coordinating circuits for final impressing on the magnetic tape, as the program may require.

While the director is processing one group of commands, following groups are being read into it to assure continuous motion of the machine upon playback of the finished magnetic tape. Visual indicators on the director's control panel provide one fine and five coarse data repeaters, which algebraically sum distance commands for each machine axis during a program. The fine indicator can be connected into each of the coarse circuits by push button.

Control of each machine axis is accomplished, in the Giddings & Lewis system of automation, by independent, closed-loop-feedback servo circuits. A movement of but 0.100 inch in a machine axis produces one complete revolution of its "tell-tale" synchro rotor.

For more data circle 361 on Reader Service Card



B-RIGHT-ON[®]

SOCKET SCREW PRODUCTS

always measure up!



Socket screw users who want *what they want when they want it* know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up. Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality. Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

Write for descriptive literature...see how

**YOU CAN DO BETTER
WITH B-RIGHT-ON.**

**THE BRIGHTON SCREW
& MANUFACTURING CO.**

READING RD. AT DORCHESTER
CINCINNATI 2, OHIO



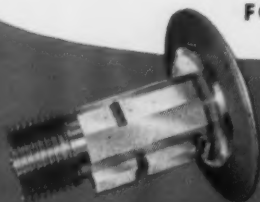
There's an EX-CELL-O

Precision Spindle

**BUILT ESPECIALLY
FOR YOUR WORK**



Single-body, belt-driven internal grinding spindle.



25 hp heavy duty precision spindle with 24" grinding wheel.



25,000 rpm high frequency inbuilt motor spindle.

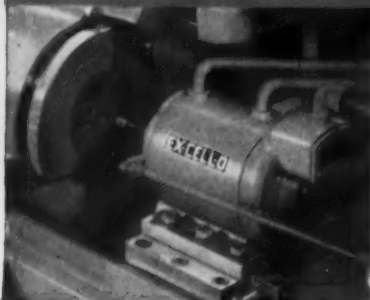
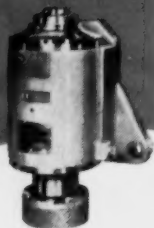


Totally enclosed inbuilt motor surface grinder spindle.



Precision inbuilt motor spindle for cutter grinder.

Heavy duty motorized precision spindle available up to 30 hp.



EX-CELL-O High-frequency Spindle, rated at 40,000 rpm, grinds small holes in bushings.



MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • GEAR AND BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

25-21

For production grinding to precision limits "just any spindle" won't do. It must be carefully selected to suit the work. From Ex-Cell-O's widely-varied line of precision spindles you can select a standard model, or we'll make one special to your requirements. These spindles have long been the original equipment choice of leading manufacturers.

Features of the line include:

- Rigidity**
- Permanent adjustment**
- No vibration, no chatter**
- Precision ball bearings preloaded for predetermined speeds**

Phone your Ex-Cell-O representative, or phone or write Ex-Cell-O in Detroit, for CATALOG LISTING HUNDREDS OF STANDARD GRINDING SPINDLES

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

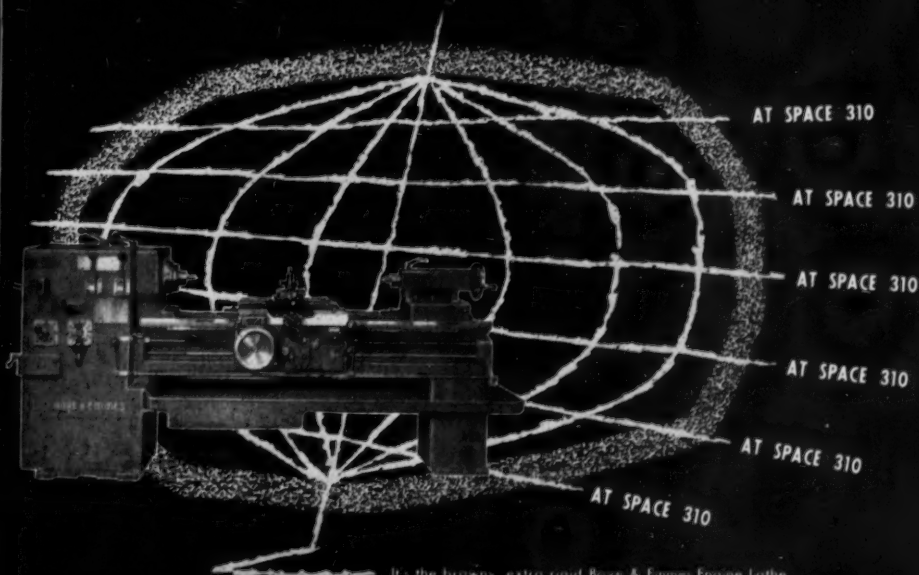
For more data circle 363 on Reader Service Card

at the machine tool show

AT SPACE 310

the world's best investment . . .

in lathes



It's the brawny, extra rigid Boyé & Emmes Engine Lathe.

The lathe you would have designed for your own use.

See it! Compare it with the finest. You will gain a new notion of modern engine lathe design.

Longitudinal power traverse through fingertip electrical controls.

Automatic, electric longitudinal and cross stops operate in either direction of travel.

Hardened and ground lead screw.

Electrically operated brake.

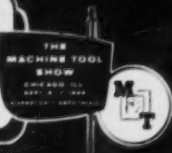
Direct reading longitudinal and crossfeed dials.

Built-in ball bearing tailstock.

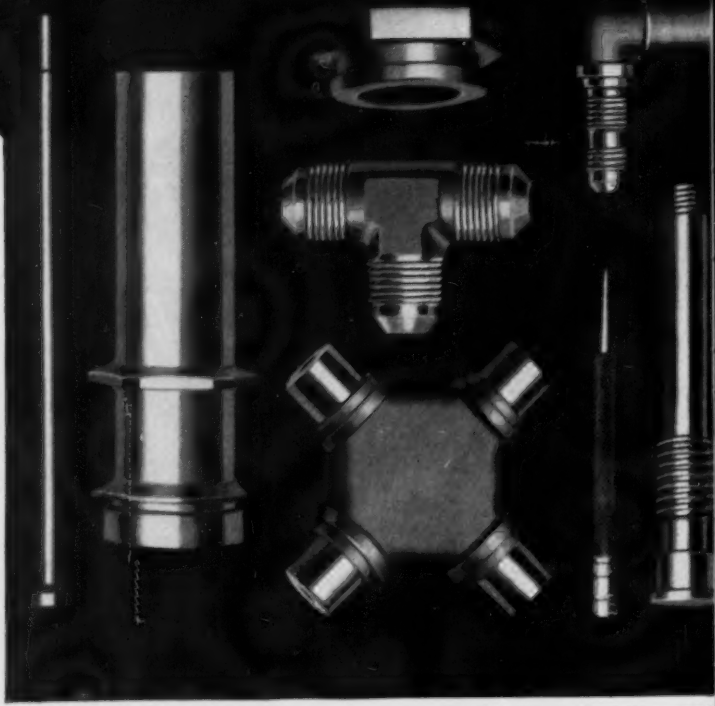
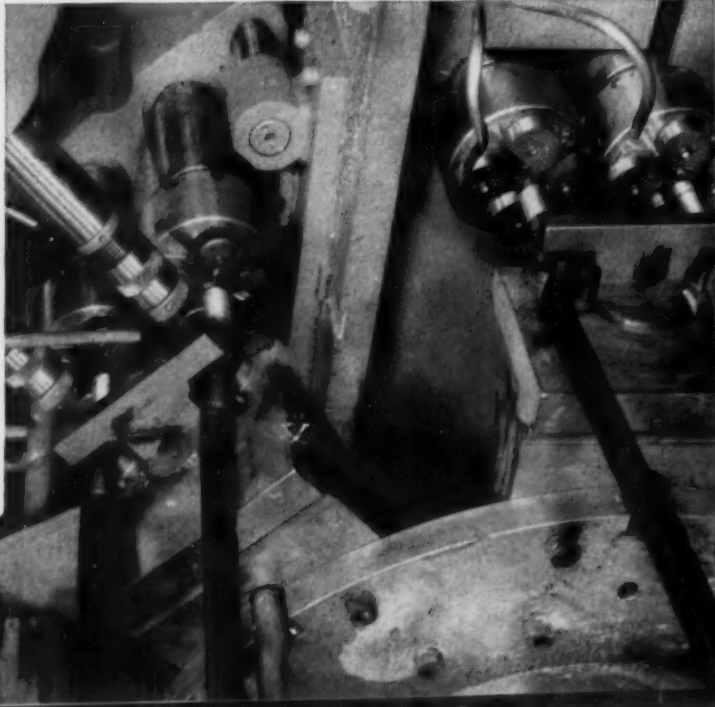
Promise yourself the pleasure

... at space **310**

BOYÉ & EMMES
MACHINE TOOL COMPANY
127 CALDWELL DRIVE
CINCINNATI 16, OHIO



**for hollow milling...end forming and
turning...for knurling, burnishing or
threading—on short or long runs**



On this Cleveland tapping machine, two Namco Vers-o-tools with circular hollow milling cutters prepare these forged steel rods for threading in the

To do threading and turning jobs like these and thousands of others, better and cheaper, investigate the Vers-o-tool system. Catalog DT-52 describes the method and shows the complete line. Our representatives will give you

On this Cleveland tapping machine, two Namco Vers-o-tools with circular hollow milling cutters prepare these forged steel rods for threading in the next station where two Vers-o-tools are equipped with circular ground thread chasers.



NAMCO VERS-O-TOOLS

save time...
tooling costs... additional
grinding operations

Hollow milling, even to a very close micro finish, is three times faster with multi-cutter Vers-o-tool Heads than with single point tools. Knurling and burnishing jobs show similar time savings and accuracies. Threading also costs less per piece because with the

24-hour deliveries on most standard stockable chasers and blocks—NC, NF, National taper pipe and Dry Seal.

Vers-o-tool "system" the guess-work is taken out of chaser grinding.

Further savings, too, in tool investment—chasers, cutters and rolls are interchangeable (size for size) in the same "double duty" Vers-o-tool heads.

SEE US AT THE MACHINE TOOL SHOW • SEPTEMBER 6 TO 17 • BOOTH NUMBERS 324 AND 703



OUR JOB: to provide the *Right Machine* for YOUR JOB

Acme-Gridley 4, 6 and 8 Spindle Automatic Bar and Chucking Machines • Fully Automatic Turret Lathes (Bar and Chuck Type) • Hydraulic Thread Rolling Machines • Automatic Threading Tools • Switches • Solenoids • Contract Manufacturing.

**THE NATIONAL
ACME COMPANY**

183 EAST 131st STREET • CLEVELAND 8, OHIO

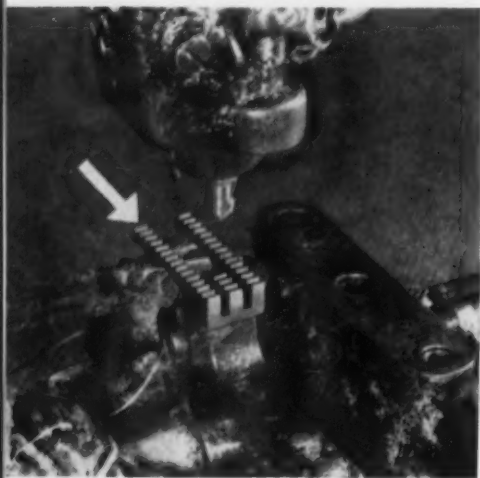
Flame-Plating Sewing Machine Feed Dogs

Unique process provides tungsten carbide coating on metal parts to increase service life.

Factory operators are cutting their sewing machine feed dog costs by as much as 70 per cent through the use of standard steel feed dogs flame-plated with a thin coating of tungsten carbide. The tungsten carbide coating, applied by Linde Air Products Company's

Flame-Plating process in Linde plants, is said to extend the service life of standard steel feed dogs to as much as six times that of uncoated parts. Extensive tests by a leading sewing machine user have shown that steel feed dogs have an average life of about one month when used on highly abrasive materials such as burlap or canvas. Flame-Plated feed dogs, however, have given as much as six months' service on the same materials.

Flame-Plating is a unique process developed by Linde Air Products Company, a Division of Union Carbide and Carbon Corporation, 30 E. 42nd St., New York 17, N. Y., for depositing a tungsten carbide coating on metal parts. Because the temperature of the base metal does not exceed 400 deg. F. during coating, finished or semi-finished parts can be coated without danger of dimensional or metallurgical change. The Flame-Plated coating may be left in as-coated condition (about 125 microinches r.m.s.), as in the case of the sewing machine feed dogs described above, or the Flame-Plated coating finished to 1 to 5 microinches r.m.s. for precise applications.



The feed dog in this industrial sewing machine (cover plate removed) has been Flame-Plated with tungsten carbide. The hard, wear-resistant coating is said to extend the service life of this part at least six times.



Remember...
A SHAVING CUTTER
IS NOT JUST
Another TOOL

EXPERIENCE

Making the successful rotary gear shaving^{*} cutter requires not only the consummate skill of the master toolmaker, but also a thorough knowledge of gear practice. The latter is acquired only the hard way, by experience — a lot of it.

No group anywhere has had as much cutter experience as Red Ring engineers. They who developed Rotary Gear Shaving. They have been learning more and more about cutters for the last 25 years — and still are.

DEVELOPMENT

It would be convenient indeed if all cutters could be made to a standard design, interpolating only for variations in basic gear characteristics.

Unfortunately, there are many variables which often make modifications essential. But, how much modification? Where to apply it? The answer again is **EXPERIENCE** with the performance data to substantiate it.

Service of this type provided by Red Ring engineers can make a valuable contribution to your gear processing operations.

Next time you buy shaving cutters be sure you are getting the maximum.

7704

SPIN AND MILLING
GEAR SPECIALISTS
ENGINEERS OF ROTARY SHAVING
AND CLUTCH TOOTH FORM

NATIONAL BROACH & MACHINE CO.

3400 ST. JEAN DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

For more data circle 367 on Reader Service Card

STANDARD[®] Dial Bore GAGES

World's WIDEST Range!

World's SMALLEST Dial Bore Gage!

NOW down to 1/16"



STANDARD GAGE, originator of the efficient, dependable, easy-handling, easy-reading Dial Bore Gage, now offers the world's widest range in these instruments, covering diameters from 1/16" up!

Wholly self-contained, light in weight, simple to handle, each size, largest to smallest, is highly accurate and practical for use at machine or inspection bench.

SMALLEST DIAL BORE GAGE IN THE WORLD

The newest member of the family, No. 8/0, covers a range from .062" to .079". It is one of a group of seven mini-size gages with a range from .062" to .380". Utilizing STANDARD's unique centering-size disc principle, these gages are automatically positioned in the bore, with a solid reference point directly opposite the gaging plunger. Easy interchange of discs permits quick conversion to various sizes within the over-all range of the gage. Discs may be had to fit individually specified bore dimensions or in complete sets for each size gage. For example, nine discs in progressive sizes are available in the .062"-.079" range of No. 8/0; twenty-seven discs in the .247"-.380" range of No. 2/0.

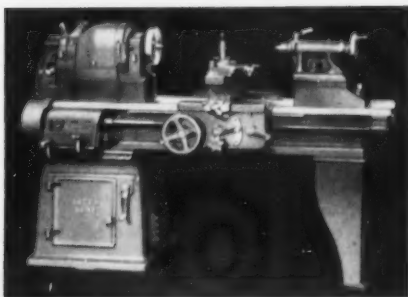
STANDARD Dial Bore Gages are available in pistol-grip types, vertical types and special types to meet unusual needs. Bring your bore gaging problem to STANDARD; simple or difficult, we have a Dial Bore Gage to solve it.

Write for detailed information

STANDARD GAGE COMPANY, INC.
34 PARKER AVENUE • POUGHKEEPSIE, N. Y.

For more data circle 368 on Reader Service Card

16-24" x 6' Quick
Change Gear Lathe
Base price \$2437
f.o.b. factory.



**SOUTH
BEND**
16-24" LATHE

CAPACITY for Big Jobs! ACCURACY for Any Job!

Here's a lathe with a versatility that makes equipment dollars go further. Its 24" swing provides the capacity for handling a variety of large diameter, medium-weight jobs whose size would otherwise require large, heavy lathes. This extra capacity is achieved without any sacrifice of efficiency in the machining of smaller work. Having an unusually wide range of spin-

dle speeds, all sizes of work can be machined at effective cutting speeds. The improved South Bend two lever gear box permits instantaneous selection of power feeds for any turning, facing, or thread cutting operation. A complete line of chucks, tools and attachments simplifies tooling the lathe. Write for catalog describing this versatile South Bend lathe.

Visit us in Booth
543 Metalworking
Equipment Expositi-
on — Chicago
Coliseum
Sept. 6-17

SEND INFORMATION CHECKED:

- | | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| <input type="checkbox"/> 9" and 10" BENCH LATHES | <input type="checkbox"/> 10" to 16-24" FLOOR LATHES | <input type="checkbox"/> DRILL PRESSES | <input type="checkbox"/> TOOL GRINDERS | <input type="checkbox"/> 1/2" & 1" Caster TURRET LATHES | <input type="checkbox"/> 7" BENCH SHAPERS |

Name _____ Street _____
City _____ State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

For more data circle 369 on Reader Service Card

Worn Valves Reclaimed By Metallizing

***Sprayed metal coating resists corrosive action
of chemicals on refinery valves.***

The reclamation department at the Standard Oil Company of California Plant in La Habra handles all of the repair work for Standard's operation in South California. There are hundreds of installations, including the huge refinery at El Segundo near Los Angeles. The repair of valves, of which there are literally thousands in the area, comprises the greater part of the reclamation work. Metallizing was a "natural" for solving some of Standard's problems. The following is a brief story of how the company began using the metallizing process and some of its opinions and experiences to date.

One of the company's welders noticed pictures of metallizing equipment in a welding magazine. He called them to the attention of a foreman, a 30-year veteran of Standard, who began a careful and concise study of the process that took over a year.

Numerous valves were metallized and then placed in the field and refineries for testing and closely watched. One of the valves put out for test is still in operation after more than a year. Those that were returned showed conclusively that this method was far superior to the old system and would mean saving

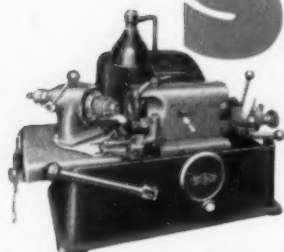
thousands of dollars every year.

The reclamation department handles up to 5,000 valves yearly. Most of them require reconditioning. During pumping operations they handle water, sand and oil. In the refineries they must control gasoline, oil, grease and other chemicals. The net result of all these factors is a very rough combination of abrasion and corrosion. Hard stainless steel has given the plugs a much greater life than before. It resists the corrosive action of the chemicals and is much tougher in contact with the mud and sand pumped up during the drilling.

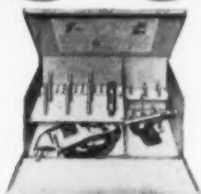


Operator in Standard Oil's reclamation department metallizes a worn valve plug.

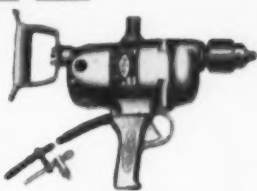
SIoux



VALVE FACE GRINDING MACHINES



VALVE SEAT GRINDER SETS



ELECTRIC DRILLS

TOOLS



PORTABLE GRINDERS



BENCH GRINDERS



FLEXIBLE SHAFTS



PORTABLE POLISHERS

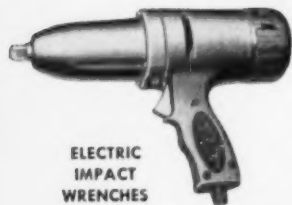


PORTABLE SANDERS

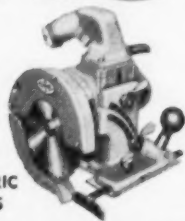
USE
SIoux
ALL THE WAY
THROUGH!

LAST

SEE YOUR
SIoux
DISTRIBUTOR



ELECTRIC
IMPACT
WRENCHES



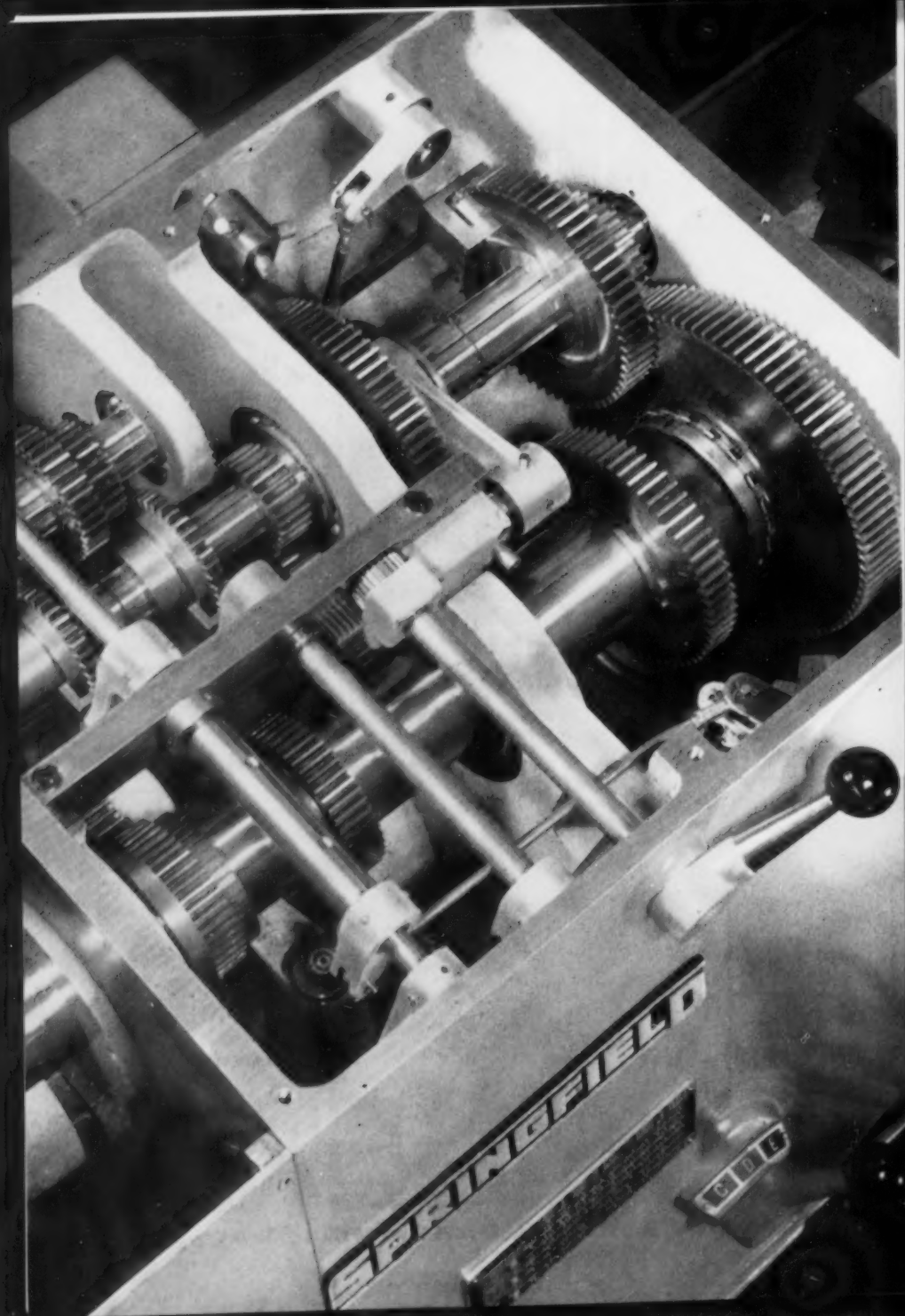
ELECTRIC
SAWS



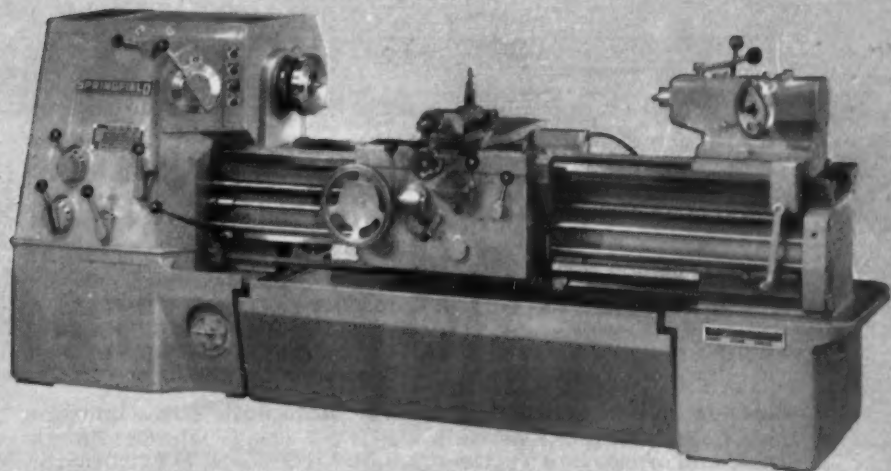
FLAT SANDERS

LONGER!

ALBERTSON AND COMPANY, INC. • Sioux City, Iowa, U. S. A.



See Springfield at Booth 612, Machine Tool Show, Chicago, Sept. 6-17.



more useful horsepower

All the horsepower in a Springfield Model "S" Lathe is productive.

A simple, straight-forward gear train, plus double-action lubrication, plus tight dynamic balance tolerances (.0005" displacement) eliminate friction and vibration, the twin horsepower thieves.

In the headstock, only the gears necessary to a given speed are engaged. Other gears run free with a stabilizing flywheel action, no drag on power.

A high pressure filtered oil mist keeps all gears and bearings drenched, and a cascade of oil lubricates the feed box.

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32".

Vertical Universal Grinders: swings 18" to 42".

The Springfield Machine Tool Company
Springfield, Ohio

65TH YEAR OF BUILDING IDEAS INTO MACHINE TOOLS

SPRINGFIELD

new literature

Use the Reader Service Cards opposite pages 32 and 292 for requesting free copies of the literature listed below.

3. Face Grinder

Abrasive Machine Tool Co., 20 Durrell Rd., East Providence 14, R. I. Face grinder equipped with motorized spindle.

4. Carbide Tools and Blanks

Adamas Carbide Corp., Kenilworth, N. J. Standard carbide tools and blanks which are available in Premium Grades 548 and 434.

5. Spot Welding Process

Air Reduction Sales Co., Division of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y. "Aircospot," an inert-gas-shielded tungsten-arc spot welding process.

6. Steels

Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa. Stainless, electrical, tool and die steels and other high alloy specialties.

7. Snap Gage

Ames Instrument Co., Concord, Mass. "Snappergage" Adjustable Snap Gage.

8. Small Motors

Barber-Colman Co., Rockford, Ill. Open-type geared small motors.

9. Balancing Machines

Bear Mfg. Co., Dept. M-25, Rock Island, Ill. "Dy-Namic" balancing.

10. Taps, Drills and Gages

Beloit Tool Corp., Beloit, Wis. Complete line of Regal taps, drills and gages.

11. Profile Grinder

Boyar Schultz Corp., 2020 S. 25th Ave., Dept. F-5, Broadview, Ill. No. 1 Profile Grinder for tool and die shops and production profile grinding.

12. Automatic Screw Machine

Brown & Sharpe Mfg. Co., Providence 1, R. I. The Model 00 Automatic Screw Machine.

13. Set-Up Equipment

J. C. Busch Co., 126 E. Pittsburgh Ave., Milwaukee 4, Wis. "Milwaukee" surface plates, angles, box parallels and straightedges.

14. Universal Safety Clamp

Carroll & Shipley, Inc., 720 W. 12th St., Anderson, Ind. Model 25 Universal Safety Clamp.

15. Box Column Drills

Cincinnati Lathe & Tool Co., 3263 Disney, Cincinnati 9, Ohio. 16-inch sliding-head box column drills.

16. Spin-Forming Machine

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. 42 x 50-inch "Hydrospin" machine.

17. Chilling Equipment

Cincinnati Sub-Zero Products, 3930-S5 Reading Rd., Cincinnati 29, Ohio. Metal chilling and testing equipment.

18. Stainless Steel Wire

Crucible Steel Company of America, Oliver Bldg., Pittsburgh 22, Pa. "Rezial" Stainless Steel Wire.

19. Gage Block Accessories

Ellstrom Standards Division, Dearborn Gage Co., 22038 Beech St., Dearborn, Mich. Square and rectangular gage block accessories.

20. Diamond Wheel Care

The Diamond Tool Co., 246 Broadway, South Haven, Mich. How to recharge and care for diamond wheels.

21. Die Set Pullers

Durant Tool Supply Co., 136 S. Water St., Providence 3, R. I. "Shur-Pull" Die Set Pullers.

22. Rotary Tools

Elgin National Watch Co., Abrasives Division, Dept. P, Elgin, Ill. "Golden-Circle" burs and rotary files in carbide or high speed steel.

23. Bushing Guide

Ex-Cell-O Corp., Detroit 32, Mich. Complete bushing guide for engineering and purchasing files.

24. Band Saws

Famco Machine Co., 3122 Sheridan Rd., Kenosha, Wis. Metal cut-off band sawing machines.

25. Punching Presses

Ferracute Machine Co., Bridgeton, N. J. Punching presses in 150 and 200-ton models.

26. Gear Production Facilities

Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill. Facilities for mass producing gears for high-precision applications.

27. Storage Equipment

The Frick-Gallagher Mfg. Co., 110 S. Michigan Ave., Wellston, Ohio. Various ideas in space and time-saving storage equipment.

28. Wheel Brush Chart

The Fuller Brush Co., 3665 Main St., Hartford 15, Conn. Slide chart of wheel brush specifications.

29. Pumps

Graymills Corp., 3705 N. Lincoln Ave., Chicago 13, Ill. Coolant, circulating and agitating pumps.

30. Hydraulic Cylinders

Hannifin Corp., 565 S. Wolf Rd., Des Plaines, Ill. Series "H" Square-Type Hydraulic Cylinders.

31. Machine Components

The Hartford Special Machinery Co., 275 Homestead Ave., Hartford 12, Conn. Standardized machine components, including hydraulic drill units, automatic cam feed drilling units, lead screw tapping units, multiple-spindle heads, automatic index tables and machine bases.

32. Oil Filters

Houdaille-Hershey of Indiana, Inc., Filtration Division, 58 South Ave., Lebanon, Ind. Honan-Crane Oil Filters.

33. Fingerprint Remover

E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. Cosmoline 1070 Fingerprint Remover.

34. Impact Tool

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Model 4U-SD Electric Impacttool.

35. Drilling Machine

The I. O. Johansson Co., 7730 Austin Ave., Skokie, Ill. Gear-driven drilling machine.

36. Machine Tool Replacement

Jones & Lamson Machine Co., 521 Clinton St., Dept. 710, Springfield, Vt. Information kit on machine tool replacement.

37. Carbide Materials

Kennametal, Inc., Latrobe, Pa. Series of cemented hard carbide materials.

38. Guide Pin Bushings

Lamina Dies & Tools, Inc., P. O. Box 31, Royal Oak, Mich. Guide pin bushings and guide pins.

39. Thread Rolling Attachment

Landis Machine Co., Waynesboro, Pa. Five series of "Lanroll" attachments.

40. Cold Finished Steel Terms

LaSalle Steel Co., Chicago 80, Ill. 32-page dictionary of steel terms for users of cold finished steel bars.

41. Tempering Furnaces

Lindberg Engineering Co., 2469 W. Hubbard St., Chicago 21, Ill. Electric "Cyclone" Tempering Furnaces.

42. Milling Cutters

Lovejoy Tool Co., Inc., Springfield, Vt. Half-side milling cutters, plain milling cutters and slotting cutters.

43. Jigs and Fixtures

Manufacturers Engineering Services, Inc., Security Bldg., Toledo 4, Ohio. "Kam-Grip" Jigs and Fixtures.

44. Milling Machines

Marac Machinery Corp., 45 S. Broadway, Yonkers, N. Y. Fritz Werner A.G. Milling Machines.

45. Boring and Facing Heads

The Maxwell Co., 325 Broadway, Bedford, Ohio. E-Z Set Precision Boring and Power-Facing Heads.

46. Surface Roughness

Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich. "Profilometer" equipment for measuring surface roughness.

47. Pneumatic Standards

Miller Fluid Power Co., 2024 N. Hawthorne Ave., Melrose Park, Ill. Complete, revised copies of J.I.C. Pneumatic Standards.

48. Automatic Boring Unit

W. K. Millholland Machinery Co., Inc., Indianapolis, Ind. Automatic boring unit featuring an automatic feed cycle.

49. Chamfering Machine

Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. Burr-Master production hypoid pinion deburring and chamfering machine.

50. Dividing Heads

Karl A. Neise, 404 Fourth Ave., Dept. MMS, New York 16, N. Y. Walter dividing heads.

51. Cutters and End Mills

Nelco Tool Co., Inc., Manchester, Conn. 800 standard cutters, end mills and drills.

52. Mechanical Toolholders

Newcomer Products, Inc., Latrobe, Pa. "Nu-Tool" Mechanical Toolholders used with "Throwaway" Carbide Inserts.

53. Roll Forming Machines

Niagara Machine & Tool Works, Buffalo 11, N. Y. Power and hand-operated slip roll forming machines.

54. Hydraulic Presses

Northern Tool & Machine Co., 1549 N. 31st Ave., Melrose Park, Ill. Hydraulic presses for production, toolroom and general shop use.

55. Thread Snap Gages

Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn. Roll thread snap gages.

56. Utility Press

The Producto Machine Co., 910 Housatonic Ave., Bridgeport 1, Conn. No. 2 Utility Press for "shearing-in" punches and dies.

57. Portable Loading Docks

The Raymond Corp., 88-134 Madison St., Greene, N. Y. "Porta-dock" portable loading dock.

58. Knurls

Reed Rolled Thread Die Co., Worcester, Mass. Data on circular and diametral pitch knurling.

59. Punches and Dies

Ring Punch & Die Co., 1008 Foote St., Jamestown, N. Y. Round, square, oblong and rectangular punches and dies.

60. Abrasives

Brightboy Industrial Division, Weldon Roberts Rubber Co., 95 N. 13th St., Newark 7, N. J. Rods, blocks, discs and wheels.

61. Platen Presses

Rodgers Hydraulics Inc., 7447 Walker St., Minneapolis 16, Minn. Line of platen presses for metal forming and metal drawing.

62. Gage Handles and Blanks

Royal Oak Products Co., 28282 John R St., Royal Oak, Mich. A wide variety of types and sizes of gage handles and gage blanks.

63. Grinding Fixture

S & E Machine Products Inc., Bridgeport, Mich. Centerless grinding fixture.

64. Grinding Wheels

Simonds Abrasive Co., Philadelphia 37, Pa. Net prices for line of grinding wheels.

65. Ring Gages

Size Control Co., 2500 W. Washington Blvd., Chicago 12, Ill. "Boremaster" Ring Gages.

66. Diamond Tool Care

J. K. Smit & Sons, Inc., Murray Hill N. J. Care and maintenance of diamond tools.

67. Plug Gages

Sossner Tap & Tool Corp., Lynbrook, N. Y. Taperlock, Trilock and Wire Type cylindrical plug gages and thread plug gages.

68. Self-Locking Nuts

Standard Pressed Steel Co., Box No. 556, Jenkintown 22, Pa. "Flexloc" Self-Locking Nuts.

69. Magnetic Brake and Clutch

Stearns Magnetic Inc., 664 S. 28th St., Milwaukee 46, Wis. Detailed clutch and brake selection data. Specifications are included.

70. Quenching Oil

Sun Oil Co., Philadelphia 3, Pa. Sun Quenching Oil Light, a high-quality low-cost quenching oil.

71. Needle Bearings

The Torrington Co., 730 North St., Torrington, Conn. Design, application and use data on five types of needle bearings.

72. Indexing Table

Troyke Mfg. Co., Cincinnati 9, Ohio. "Roto-Indexer" indexing table available in four different models.

73. Measuring Instruments

Tubular Micrometer Co., St. James, Minn. Micrometers, gages, indicators, calipers, rules, squares, vernier tools and checking standards.

74. Stamping Machine

U. S. Tool Co., Inc., Ampere (East Orange), N. J. "Multi-Slide" Machines for the production of stampings.

75. Tool Steel Guide

Vanadium-Alloys Steel Co., Latrobe, Pa. Tool steel guide providing data on more than 50 types of tool steels and cold finished products.

76. Toolholders

Vascoloy-Ramet Corp, Waukegan, Ill. Style RBR-RRL toolholders.

77. Bending Machines

Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill. Data on bending machines.

78. Power Bench Press

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Series "E" open-back power bench presses.

79. Dies and Punches

Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill. Complete line of punches and dies.

80. Turret Punch Press

Wiedemann Machine Co., Dept. 156, 4219 Wissahickon Ave., Philadelphia 32, Pa. R-61 Heavy-Duty Turret Punch Press.

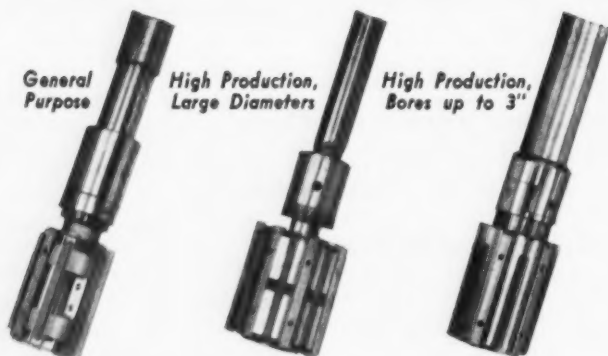
81. Feed-Speed Calculator

Willey's Carbide Tool Co., 1243 W. Vernor Highway, Detroit 1, Mich. Feed and speed calculator, a guide for tungsten carbide machining.

82. Precision Tool Kits

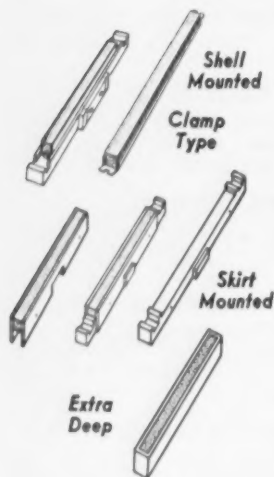
S. J. Williams Precision Tool Kits, Inc., 448 Soo Line Lane, Schiller Park, Ill. Line of "DOIT" URSELF precision tools.

* these
are the
reasons —



BARNESDRIL honing tools and abrasives

Provide Greater Productive Life — at Lower Stone Costs!



*** Plugmatic Sizing**

The Plugmatic Gauging Member directly sizes the bore being honed. Gauge is self-aligning and not affected by misalignment or eccentric stone wear. Bore-to-Bore accuracy is guaranteed within "tenths".

*** "Extra Deep" Plas-T-Clad Stones**

Patented Barnesdril mounting provides up to 300% more usable stone life, with greater support closer to the cutting edge. Freer cutting action results, with longer abrasive life and less downtime for replacement.

*** Electronic Feed Control**

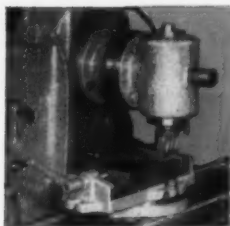
Electronic feed control operates automatically to maintain proper pressure between stone and work surface at all times. Adjusts automatically to compensate for stone wear, and keeps honing operation at peak efficiency.

Write for Catalog 500A

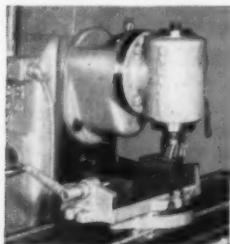
BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS

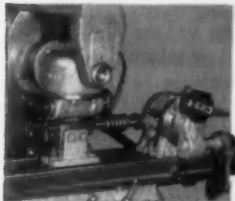
For more data circle 373 on Reader Service Card



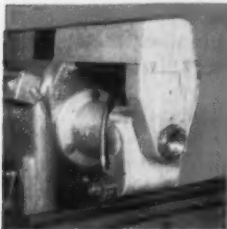
Heavy Duty Vertical
Milling Attachment



Heavy Duty Offset
Vertical Milling Attachment



Universal Milling Attachment



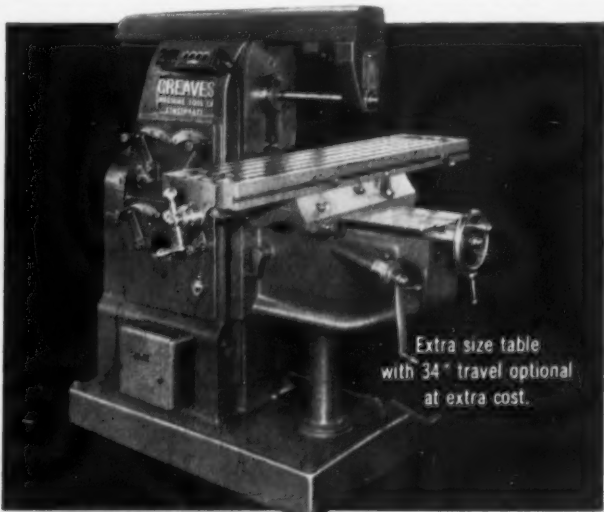
Rack Milling Attachment

Send coupon for
FREE Comparison
Chart and detailed
descriptive literature
on easy-to-use
attachments.

Heavy duty attachments Increase versatility of dependable, low-cost **GREAVES MILLS**

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS. Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table
with 34" travel optional
at extra cost.

GREAVES MACHINE TOOL CO.
2700 Eastern Avenue, Cincinnati 2, Ohio

Send Comparison Chart. I will make my own comparison
of GREAVES MILLS with other makes.
Send information on Attachments and Accessories for
GREAVES MILLS.

NAME	TITLE	
FIRM		
ADDRESS		
CITY	ZONE	STATE

For more data circle 374 on Reader Service Card

new shop equipment

***Descriptions of new machines, tools
and materials for the metalworking
industry***

SURFACER PROVIDES SPEED AND UNIFORM PRESSURE ON THE WORK

Designated as the Model 16, an ultra-speed surfer which is said to provide maximum speed plus positively uniform pressure on the work regardless of shape, without expensive fixtures, has been announced by Fenlind Engineering Co., 5602 Pike Rd., Loves Park, Illinois.

The unit is a coated-abrasive belt-type surfer, designed specifically for producing a true, finished starting surface on rough castings. The machine utilizes a unique magnetic platen and a simple, positive work holding and

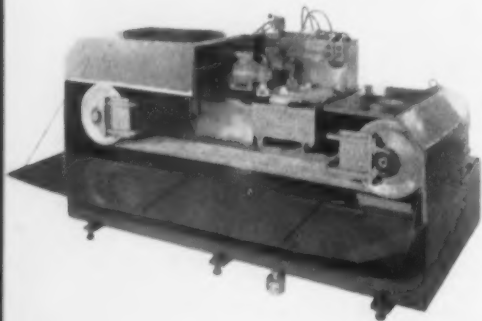
turning device. The work is held in position on the belt over the platen, which pulls the work against the belt with a strong, uniform pressure. The pressure is adjustable from 0 to 185 p.s.i., giving the operator a choice of cutting speeds for all types of work.

The work-holding fixture consists of a 16-inch wooden or aluminum disc. The interior of the disc is cut out to conform with the shape of the casting in such a way that the disc will rest on the casting in a position parallel to the surface to be finished. On the side toward which the belt is moving are two knurled spindles, eccentrically mounted on motor-driven shafts. The disc rides against the spindles which rotate and oscillate the workpiece across the belt.

The Model 16 accommodates a 16-inch belt which is 18 feet in length. The machine can also be supplied in models for 8, 12 and 20-inch belts. The driving drums are powered by two 15-h.p. motors which produce a surface speed of 7,200 feet per minute. The unit can be used for wet or dry surfacing, depending on the nature of the work.

Lateral carbide laminations protect the surface of the magnetic platen from wear, and the platen has its own water cooling system.

For more data circle 83 on Reader Service Card

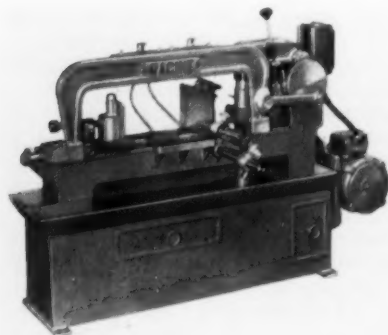


Fenlind Model 16 Speed Surfacing Machine

METAL-CUTTING SAW FEATURES LARGE CAPACITY

Identified as the Model 816, a hydraulically-operated, utility metal saw designed to handle the full range of general cut-off work from tough tool and dies to mild bars, tubing and structural shapes up to 8 x 16 inches in size has been announced by Racine Hydraulics & Machinery, Inc., 2070 Albert St., Racine, Wis. A single limit switch controls an efficient drive, eliminating the need of a clutch. There are no train of gears, levers or ratchet devices used. At the completion of each cut, the motor stops and the saw frame automatically rises to its highest point.

The sawing machine is equipped with a quick-acting, self-positioning type vise for cutting any angle up to 45 degrees. A large coolant reservoir and separate dry pump compartment are included. The machine is fitted with six cast iron gibs having complete horizontal and vertical adjustment. The frame and guide are counterbalanced. All revolving shafts are fitted with accurately pressed extra-large lubricated bronze bushings. An adjustable height gage limits the travel of the saw frame, and the machine utilizes a simple, compact hydraulic feed and control system.



Racine Model 816 Metal-Cutting Saw

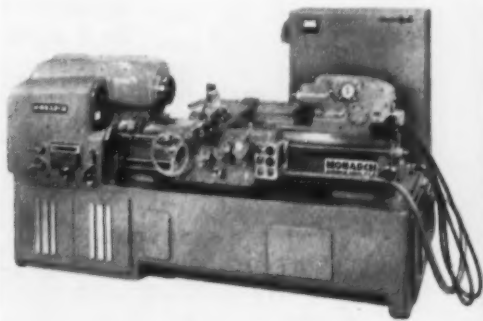
Pressure of the blade is controlled by a single graduated dial, and rate of feed is controlled by a small throttling valve which provides for smooth "oil-cushioned" operation.

For more data circle 84 on Reader Service Card

★ ★ ★

LATHE IS DESIGNED FOR BOTH MANUFACTURING AND TOOL- MAKING APPLICATIONS

Developed for both manufacturing and toolmaking applications, the Series EE, Model 1000 Precision Turning Lathe has been announced by The Monarch Machine Tool Co., Sidney, Ohio. An important design feature of the machine is an all-electric speed control mechanism offering infinitely variable cutting speeds. A single electric control knob provides any desired speed within the particular range selected. Four hydraulically actuated speed ranges are available and shift automatically upon the setting of a range selector switch. Both the speed control and the shift are located convenient to the operator at the apron. The machine is also equipped with built-in constant surface cutting speed for accuracy and finish. Constant surface



Monarch Series EE Model 1000 Turning Lathe

SUPERBORE

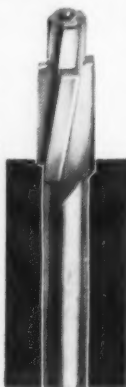
COUNTERBORES

**in Standard sizes and Oversizes
— above standard dimensions**

- **Finest High Speed Steel**
- **Smooth, Fast, Free-Cutting Operation**
- **No Clogging or Freezing of Chips**

• Fore and Aft precision grinding of flutes and pilot allow chips to flow out freely. SPECIAL Pilot and Flute diameter's ground from blanks in three to four days.

• SUPERBORE counterbores in stock for immediate delivery.



write for BULLETIN No. 20

GARBERDING

STOP PINS

• STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. NO THREADS inside STOPS for springs to catch on.



in 5 sizes



write for BULLETIN No. 25

in emergency phone: LIBERTYVILLE 2-4200

**TWENTIETH CENTURY
MANUFACTURING CO.**

ROUTE 176 and BRADLEY ROAD
BOX 429 LIBERTYVILLE, ILL.

For more data circle 375 on Reader Service Card
166 modern machine shop

new shop equipment . . .

cutting speed is recommended particularly on facing operations and can also be used to advantage on multiple diameter shaft work.

An electronic rectifier system, located in a separate electrical control cabinet, provides power for the lathe's 20-h.p., d.c., variable speed, main drive motor. The "spindle motor load" meter, installed on the front of the control cabinet in full view of the operator, permits the motor load to be constantly supervised. Motor control and load compensation are handled electronically through the use of vacuum tubes and relays.

The load compensation control keeps motor speed constant within 5 per cent from no load to full load at any particularly speed setting. In addition, the full 20 h.p. of the motor may be used at speeds as low as 107 r.p.m. in low range. Below 107 r.p.m., armature control provides constant torque down to 25 r.p.m. This is said to be of particular importance when it is necessary to take heavy cuts on large diameter work.

The apron of the Model 1000 provides power rapid traverse to both the carriage and the cross slide. Control is by means of longitudinal and cross feed friction levers. Power for the rapid traverse is supplied by an individual motor-driven unit equipped with a safety clutch which releases automatically in case of accidental jamming during any traverse movement. The two speed hydraulic tailstock incorporates hydraulic clamping and unclamping, plus a slight lifting action supplied by spring-loaded rollers. Tailstock spindle travel is by means of hydraulic power with finger-tip control. Spindle travel in either direction is claimed to be free of backlash, and the valving is so arranged that substantial-

August, 1955

SAVE VALUABLE SHOW TIME!

**Write for your FREE
Admission Form Now!**

**Chicago, Illinois
Sept. 6th-17th**

Fill in this blank. Cut it out and mail it to us now. We will send you a complimentary admission ticket to the *Coliseum Machinery Show*. By presenting a filled-out admission ticket at the entrance to the show, you will save all registration delays and entrance fees. (The *Coliseum Machinery Show* is on your way from the "Loop" to the Machine Tool Show.)

More Time to See "All Three"

1. Machine Tool Show
(International Amphitheatre)
2. Coliseum MACHINERY SHOW
(Chicago Coliseum)
3. Production Engineering Show
(Navy Pier)

(COLISEUM MACHINERY SHOW)
(Free Admission Service)

SHELDON MACHINE CO., INC.
4250 North Knox Ave. Chicago 41, Ill.

Gentlemen: Please send my free admission ticket to the Coliseum Machinery Show.

Name _____ Title _____

Company Name _____

Street Address _____

City _____ State _____

☐ I AM ALSO INTERESTED IN NEW CATALOGS DESCRIBING:

☐ Sheldon 10" ☐ 11" ☐ 13" ☐ 15" lathes

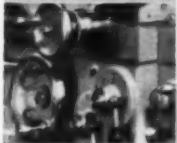
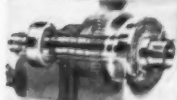
☐ Horizontal Milling Machine

☐ Sheldon 12" Shaper

☐ Have representative call

☐ Company Home

All of these will
be demonstrated
at the
COLISEUM SHOW
BOOTH 702
CHICAGO



Write for these
new catalogs to preview our "tools in action"
display at the Coliseum Machinery Show,
Booth #702.

✓ CHECK the wide range of Sheldon precision
toolroom and production lathes, milling machines and
shapers you want to be sure to see.

✓ CHECK the important features of these modern
machine tools that you will want demonstrated.

✓ CHECK-IN at Sheldon Booth No. 702, Chicago
Coliseum Machinery Show. Take your own test cuts.
Test, for yourself, the performance of these new and
modern cost-saving machine tools.

SHELDON

Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.

SHELDON MACHINE CO., Inc. • 4250 North Knox Ave. • Chicago 41, Ill.

For more data circle 376 on Reader Service Card

new shop equipment . . .

ly constant pressure affords sensitivity to the controls.

The headstock of the lathe offers four infinitely variable, overlapping speed ranges—forward or reverse. Any speed between 25 and 2,000 r.p.m. may be secured. The first three ranges are geared ranges, while the fourth range

is direct through a multiple V-belt drive. All gearing is idle when the high speed range is engaged.

For more data circle 85 on Reader Service Card

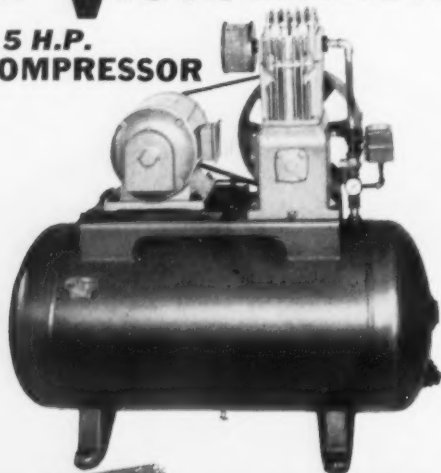
★ ★ ★

GRINDING WHEEL CUTS QUICKLY

Designated as the Blue Flash "BF," a raised-hub disc wheel which is designed to take maximum advantage of the cutting ability of each abrasive grain, permitting them to penetrate deeply and take big bites of metal, has been announced by Bay State Abrasive Products Co., Westboro, Mass. The manufacturer states that in action, the wheel has a sharpness that results in fast metal removal with minimum work pressure. This sharpness is also claimed to exist on the entire un-

NEW VICTORMATIC

**5 H.P.
AIR COMPRESSOR**



**FREE
30 Day Trial**

\$349⁰⁰
COMPLETE

ONE YEAR GUARANTEE!

Also 1/2 to 20 H.P. Air Compressors/Send us your requirements today!
812-A Lake Street, Chicago 7, Ill., Phone DElaware 7-4512

VICTORMATIC CO.

For more data circle 377 on Reader Service Card



**Bay State Blue Flash
"BF" Disc-Type
Grinding Wheel**

It's New... It's Different

TROYKE ROTO-INDEXER

(Patented)

Takes the place of Expensive Jigs and Fixtures in Connection with Milling, Drilling, Jig Boring, Grinding and Slotting.

INDEXING

Rapid • Positive • Accurate



MODEL AC-12

12" Roto-Indexer with Special 12" Diameter Steel Body Chuck.

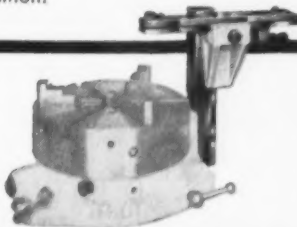


MODEL AH-12"-15"

Roto-Indexer with
T-Slotted Turntable

Features: Unique Patented Block-out Arrangement. • Hardened and ground twenty-four station index plate—any or all stations can be blocked out with use of screw driver only. • Hardened and ground plunger. • Rigid Locking (Adjustable). • Center bearing adjustable for wear. • Two oil grooved bearing surfaces for rigid support of the table. • Graduated in Degrees. • Can be used in vertical or horizontal position.

Two Models of Drilling Attachments
Available on all models.



The Roto-Indexer is a Quality Product at a Low Price

TROYKE MFG. CO., CINCINNATI 9, OHIO

4422 Appleton Street

Ask for complete Catalog No. 20 Giving Full Details

For more data circle 378 on Reader Service Card

new shop equipment . . .

derside of the wheel, permitting easy grinding and blending of external corner welds and convex surfaces. Strongly reinforced internally and on the back, the wheel is said to be ideal for all weld grinding and portable cut-off applications found in metal fabricating plants and foundries. The wheel is available in 7 and 9-inch diameters.

For more data circle 86 on Reader Service Card

★ ★ ★

SPECIAL MACHINE PROCESSES TRANSMISSION FLYWHEEL HOUSINGS

The Cross Co., Detroit 7, Mich., has announced a special machine tool which is designed to completely machine flywheel housings for both standard and automatic transmissions, except for grinding three faces. Either part may be produced as required. This flexibility for scheduling is made pos-

sible because the set-up changes and the proper tools are selected automatically at each station. There are 139 operations performed on 170 pieces per hour at 100 per cent efficiency. The operations performed include 49 drilling, 22 chamfering, 4 reaming, 2 counter-boring, 30 inspection and 30 tapping.

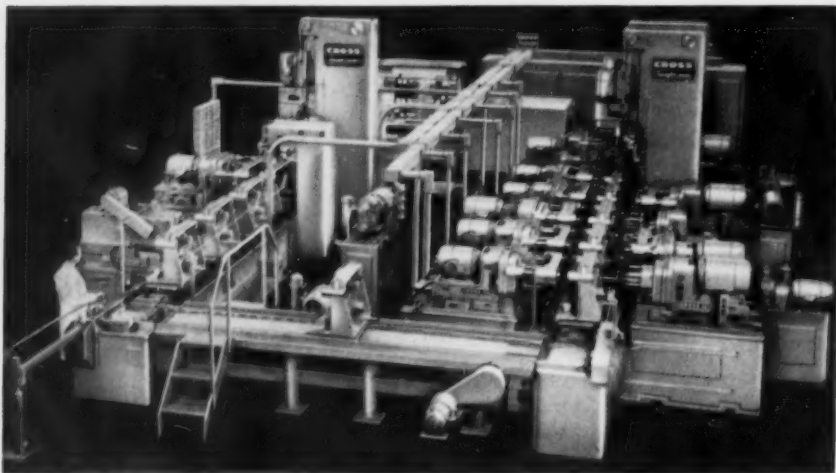
Because the parts are irregular in shape, special palletized work-holding fixtures are provided. The parts are clamped to the fixtures by hydraulic power wrenches. The pallets transfer automatically from station to station and return to the loading station. To assure easy maintenance and a degree of flexibility for part design changes, all standard and special parts are interchangeable.

For more data circle 87 on Reader Service Card

★ ★ ★

AUTOMATIC MACHINE BROACHES I.D. OF LAMINATED ROTORS

American Broach & Machine Tool Co., Ann Arbor, Mich., has introduced

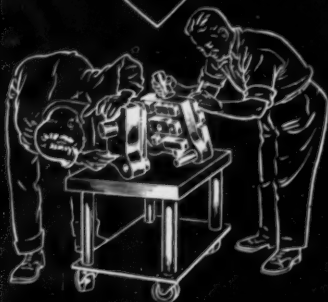


Cross Special Machine for performing 139 operations on transmission flywheel housings

**do you
WASTE MONEY
RISK ACCIDENT
doing things the
HARD WAY?**

Take

a trip through
your plant today and note how
many assembly and
maintenance operations are
being done in awkward
or tiresome
positions.



Imagine

THEM BEING DONE ON

PORTELVATOR

THE HANDY HAMILTON PORTABLE ELEVATING TABLE

With Portelvator hundreds of assembly and
maintenance jobs are accomplished at
the right height and in the best light.
And that means money in the bank
and workmen on the job; faster
work and fewer accidents.



Portelvator prices start at \$155.00—
place a couple at your workmen's
disposal and watch results.

Complete description in
FREE Bulletin No. P-5403.

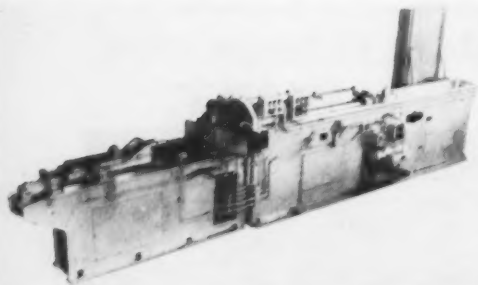
WRITE FOR IT!

Address The Hamilton Tool Company,
828 South Ninth Street, Hamilton, Ohio

 **IT'S A**
Hamilton Tool
USE IT WITH CONFIDENCE

For more data circle 379 on Reader Service Card

new shop equipment . . .



American Automatic Broaching Machine

an automatic horizontal broaching machine, with electrical controls, for broaching the i.d. of laminated rotors for electric motors. Designed to fit in a conveyor line, the machine automatically positions, clamps, broaches and ejects the rotors one at a time. A sliding fixture with automatic split vees is used to position and clamp the part. These vees retract individually to accept parts from the conveyor line and eject them after broaching. An automatic broach carrier and clamp mechanism, interlocked to the machine cycle, carries the broach forward through the part until it connects with the broach pull head. A hollow clamp nose on the carrier slides the fixture forward, seating it, and then clamps within the flanged rim of the part.

Following the broaching stroke, a drag link in the carrier returns the fixture to alignment with the chute, allowing the part to be ejected. A step cycle then moves the carrier forward to pick up the broach and return it to the starting position. A universal chute, which can be adjusted in size to accommodate several different rotors, feeds the parts to the fixture. Retracting jacks in the chute are used to hold and release the parts one at a time.

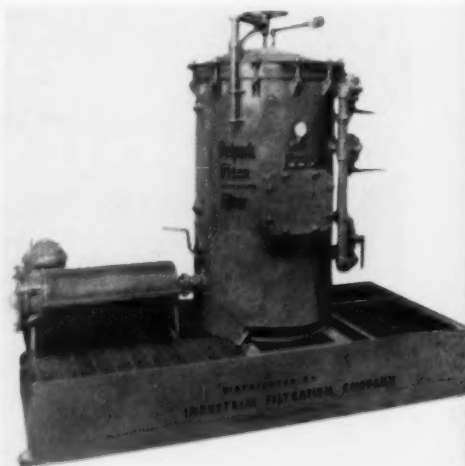
Operation of the cycle is completely automatic, and the machine continues to cycle as long as parts coming in actuate the electrical interlocks.

For more data circle 88 on Reader Service Card

★ ★ ★

DIATOMACEOUS EARTH FILTER IS AUTOMATIC IN OPERATION

Industrial Filtration Co., Dept. O-294, 13 Industrial Ave., Lebanon, Ind., has announced the Delpark-Olson Superflow Filter which uses diatomaceous earth with tubular filter elements. Screen elements are precoated with diatomaceous earth, forming a filter cake through which the fluid passes. According to the manufacturer, diatomaceous earth does not affect additives present in most oils and processing fluids. Cleaning is automatic and is accomplished in from one to three minutes by back washing. Liquid is forced back through the tubular filter elements from the inside. The earth cake is knocked off and allowed to settle to



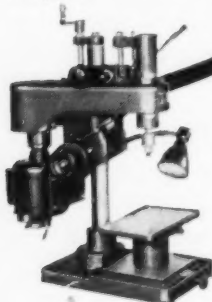
Delpark-Olson Diatomaceous Earth Filter

precision product?

**EXACT
HOLES ARE
IMPERATIVE!**



HAMILTON VARIMATIC:
Super Sensitive
Variable Speed
Small Hole
Precision
Drilling Machine



Are you fighting the never-ending battle of trying to produce exact holes on a drilling machine which, itself, is not built to precision tolerances? You are under no necessity to do so. For the difference in price between the cheapest bench type, small hole drilling machine and the Hamilton Varimatic is reckoned in pennies per day. And the Hamilton Varimatic (holes from .004" to 1/4" in all drillable materials) is super sensitive. Provides speeds, infinitely variable, between 840 R.P.M. and 9300 R.P.M. Its built to precision tolerances, and with the stamina to retain precision.

Get prices and specifications without obligation

ASK FOR **FREE** BULLETIN 5408

Address The Hamilton Tool Company
828 South Ninth Street
Hamilton, Ohio

IT'S A
Hamilton Tool
USE IT WITH CONFIDENCE

For more data circle 380 on Reader Service Card

new shop equipment . . .

the cone of the filter. Agitation in the cone prevents packing of the sludge.

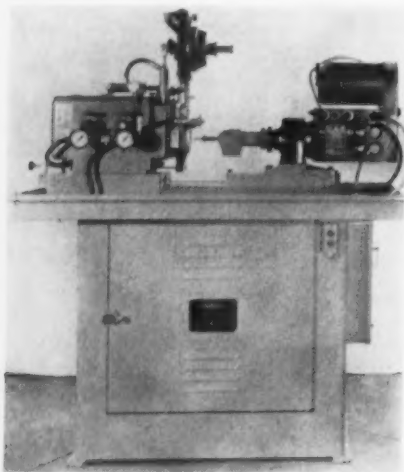
All operations are simple. The cleaning-out process is done without emptying the filter and is fast, clean and easy. The filtering unit is said to be particularly applicable for coolants, cutting oils, test stand oils, hydraulic oils, industrial cleaning solvents and chemicals. The filter is available in capacities ranging up to 175 gallons per minute.

For more data circle 89 on Reader Service Card

★ ★ ★

MACHINE LOCATES AND HOLDS HEADED PARTS FOR DRILLING OR TAPPING

Batchelder Engineering Co., Inc., 125 Main St., Springfield, Vt., has announced the Model No. 410 Automatic Drilling or Tapping Machine which is



Beco Model 410 Drilling or Tapping Machine

designed to accurately locate and securely hold rivets or other headed parts for axial tapping or drilling to very thin walls, without out-of-round distortion and central with the axis of the parts. Automatically self-reversing tapping attachments are used for tapping.

Change-over from drilling to tapping can be accomplished quickly and easily. Coolant tanks containing different coolants can also be exchanged quickly, thus eliminating the necessity of cleaning out the machine base and storing the unused coolant in other containers when changing from drilling to tapping.

According to the manufacturer, production in mild steel with a No. 30 (0.1285 inch) drill 9/32 inch deep is 40 per minute, No. 17 (0.173 inch) drill 5/32 inch deep is 45 per minute and No. 8-32 tap 3/16 inch deep is 80 per minute. The machine operates by electrically controlled compressed air on at least 50 p.s.i. air line pressure at approximately 500 strokes per cubic feet of free air. Solenoid three-way valves controlled by relays and sensitive switches regulate the cycling. If a part is not properly positioned or if the hopper runs out of parts, the machine shuts off automatically. The machine is claimed to be adaptable to hollow milling, centering, step drilling, countersinking, spot facing, reaming and certain combinations of these various operations.

For more data circle 90 on Reader Service Card

★ ★ ★

LEAD SCREW TAPPING UNIT IS FULLY AUTOMATIC

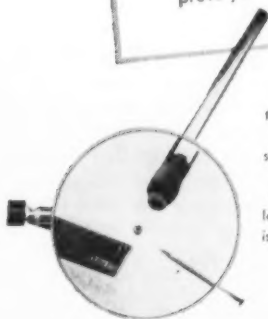
Identified as the Model TU-415, a lead screw tapping unit which is fully automatic has been announced by Wisconsin Drill Head Co., 4985 N. 124th St., Butler, Wis. The compact assem-



PRECISION GEARS

YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



WANT FACTS?

Write for Bulletin No. 5419.
Address The Hamilton Tool Company
828 South Ninth Street,

Hamilton, Ohio.



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

For more data circle 391 on Reader Service Card

new shop equipment . . .

bly is completely self-contained and may be mounted in any position. It is furnished as standard with a flanged quill and slotted spindles for close-coupled multiple-spindle tapping heads. Guide bar brackets afford rigid support for the guide bars and the mul-



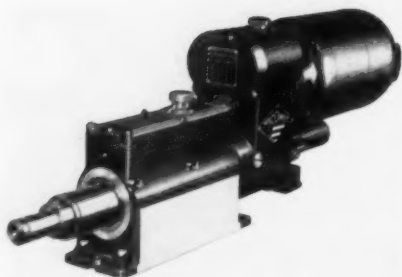
COLLIS COLLET EQUIPMENT

★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

THE COLLIS COMPANY
DEPT. A, CLINTON, IOWA

For more data circle 382 on Reader Service Card

176 modern machine shop

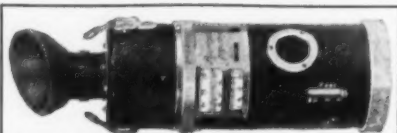


Wisconsin Model TU-415 Tapping Unit

multiple head. The Model TU is also available without the quill flange and with a 1-inch bore adjustable adapter spindle for single-spindle tapping.

The tapping unit is equipped with limit switches at each end of the quill travel to provide protection against over-travel of the spindle. Tap protection against end thrust is provided by a unique construction feature which stops the spindle instantly should the tap enter an undrilled hole. Stroke length is fully adjustable from 0 to 4 inches and a dial control can be locked to prevent tampering. According to the manufacturer, an outstanding feature of the taper is the short set-up time required for changing the lead screw, spindle speed and spindle travel. The

(Continued on page 180.)



The simplified PYRO Optical is the Ideal Instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOL-PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS, Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 85

THE PYROMETER INSTRUMENT CO.
New Plant and Laboratory, Bergenfield 42, N. J.

For more data circle 383 on Reader Service Card

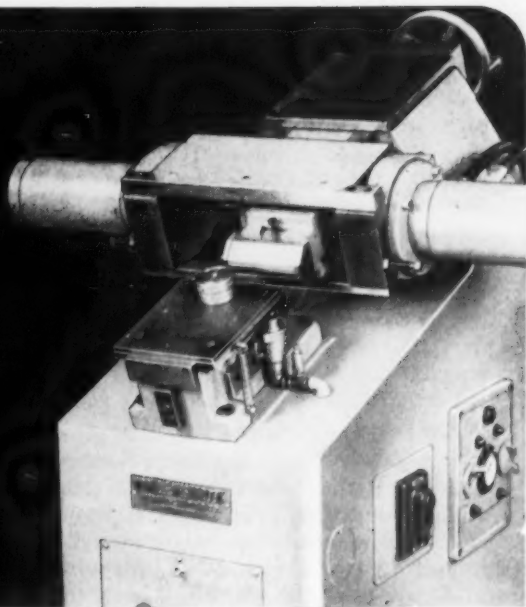
August, 1955

New!

SERIES


46

UNIVERSAL
ROLL-MARKING
MACHINES



Features New Dual-Function Head

The Dual-Function Head is another NOBLEWEST contribution to faster, better marking at lower cost. The DFH incorporates a pneumatic pressure ram for depth of mark, and a pneumatic die slide for permanent Roll Marking. The DFH can be mounted horizontally, vertically or at an angle (as illustrated) . . . thus permitting wide flexibility in work capacity, both as to size and shape. Series 46 can be used for marking round or flat surfaces, precision graduating, serial numbering and knurling. Like all NOBLEWEST Roll Marking equipment, Series 46 produces sharp, permanent, sunken impressions . . . good for the life of your product. For complete information write Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn.



NOBLEWEST
IMPROVED
MARKING
DEVICES

MARK IT BEST WITH

NOBLEWEST

ORIGINATORS OF THE ROLL MARKING PROCESS

EQUIPMENT FOR MARKING • GRADUATING • EMBOSsing • NUMBERING

For more data circle 384 on Reader Service Card

Report to

Here at Miller Fluid Power we have a pattern which we follow. A goal at which we are shooting. The pattern isn't too simple. And the goal isn't an easy one. But we've been making progress. Our position right up in the van of the industry proves that.

Our job is the production of cylinders. Basically, there's nothing anyone can do to alter a cylinder. It was old a hundred years ago. It probably won't change basically in another hundred years. But in the details of the cylinder, change is the major element.

Which is very much like industry itself. Basically industry has not changed since free enterprise was conceived on this continent. But in every detail it changes from year to year.

It's the Thousandths That Count

There was no single big thing wrong with the cylinders being manufactured yesterday. Just a lot of little things. So Miller Fluid Power made the improvement of little things its business.

We experimented with new materials and made safer, more dependable steel heads and caps. We hard-chrome-plated 110,000 PSI yield point steel to improve radically the piston rods. We raised the efficiency of operation to new peaks. Striving for quality in the smallest detail we improved in a dozen parts which are hidden from sight.

For instance, most cylinders leaked in operation. Miller made one that wouldn't leak. To prove it, we went away out on a limb and guaranteed leakproof operation. And made the guarantee stand up.

We Learn by Listening to You

We saw our customers as thousands of men in thousands of shops wrestling with thousands of production problems. We made those problems ours and produced cylinders to whip those problems. Maybe we didn't revolutionize the cylinder business in the process. But we sure helped. We know that.

Visit Miller

BOOTH #1819-1823

Production Engineering

NAVY PIER

SHOW

CHICAGO

Cylinder Users . . .

We learned to produce what we believed was the best cylinder on earth. We also learned that the best cylinder today wouldn't be good enough tomorrow. So, with the good one in production, we listened some more, experimented, and came up with a better one.

Miller Fluid Power is a young company in an old field. We are young, progressive, and willing to listen. We innovate without being prodded.

Discussion is a Two Way Street

On occasion we like to have others listen to us. Especially when what we have to say will help our customers. That is the idea behind our College of Cylinder Knowledge. We know a lot about cylinders. Though not as much today as we will tomorrow or the day after.

In our College of Cylinder Knowledge we try to show you what good cylinders can do for you. And what you should demand in any cylinder you buy. We meet other men who know what they want in a cylinder. We listen to their wants and try to explain what perfection in detail means.

We believe that when the users of cylinders sit down across the table from the producer who is trying to make the best, better cylinders result.

We'll be carrying that belief into the Production Engineering Show at Navy Pier in Chicago on September 6. Our College of Cylinder Knowledge booth will be open for that kind of discussion. We'll listen and learn.

The only way we can learn is from you. We can help you. But not until you've dropped that problem of yours in our lap. Your problem contains the stuff of which the better cylinder will be made. The cylinder that will have that quality plus which we like to think is the stamp of Miller Fluid Power.

Remember this when you see the sign over Booth 1819-23. We'll be there to listen to your suggestions, demands and questions. Also, because we are in the cylinder business, we'll be there to show you a cylinder you will want to buy.

Frank Flick

President

MILLER FLUID POWER COMPANY

2024 N. Hawthorne Avenue

Melrose Park

Illinois

For more data circle 386 on Reader Service Card

TAYLOR



Balancing Machines



with "Speed Button" Control!

Just press the button . . . and read amount and location of out-of-balance immediately on the HI-MAX spirit level! "Speed Button" reduces operator fatigue, increases work output. Handles pieces up to 60" in diameter. Ideal for FANS • FLYWHEELS • IMPELLERS • GRINDING WHEELS • COUPLINGS • SHEAVES • PUMPS • CLUTCHES • BRAKE DRUMS • MANY OTHERS. Write for Bulletin 2925B.

TAYLOR DYNAMOMETER AND MACHINE COMPANY

See Demonstration Units At Booth 965
National Metal Exposition

DYNAMOMETERS • BALANCING MACHINES
DRILLING MACHINES

6411 River Parkway, Dept. MM, Milwaukee 13, Wisconsin
INTERNATIONAL DIVISION—DUMMANN WORLD
TRADE CO., Milwaukee 6, Wisconsin, U.S.A.

For more data circle 387 on Reader Service Card

180 modern machine shop

new shop equipment . . .

(Continued from page 176.)

unit can be completely reset in a few minutes. All standard lead screw pitches, from 6 to 32, are available. All controls are built-in. A reversing motor controller and initiating switch or push-button are all that is required to operate the unit. All parts are readily accessible for ease of maintenance and adjustment. The Model TU-415 is especially designed for single or multiple-spindle precision tapping on special machines.

For more data circle 91 on Reader Service Card

★ ★ ★

GRINDER SHARPENS SMALL DRILLS QUICKLY AND ACCURATELY

Alina Corp., 401 Broadway, New York 13, N. Y., has announced a drill grinder which is designed to sharpen small drills in as little as 30 seconds. Utilizing two chucks, the machine is

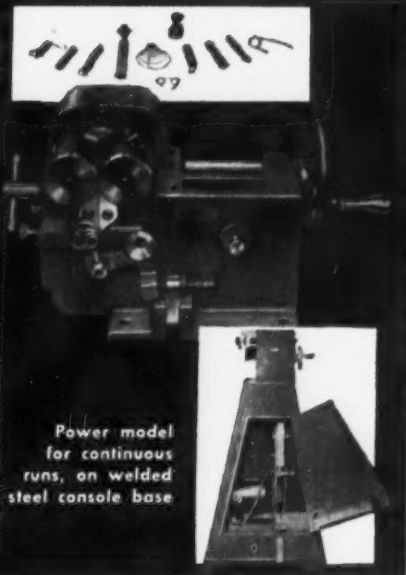


Alina Small Drill Grinding Machine

August, 1955

Make any type spring, without arbors, **FAST** with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from $\frac{1}{16}$ " to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



Hold any machine work at any **EXACT** angle with sturdy **OMNI-VISE**!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), **OMNI-VISE** #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x $1\frac{1}{2}$ ", open to 4". Base is 9" in diameter with one side straight. Inset shows **OMNI-VISE** #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, $4\frac{3}{4}$ ". Jaws, $2\frac{1}{8}$ ". Opening, $2\frac{1}{4}$ ". Base, $7\frac{1}{4}$ " x 5". For grinding, drilling or general work at any angle, by hand or machine, an **OMNI-VISE** is the machinist's choice.

EXCLUSIVE DISTRIBUTORS OF
PRECISION MACHINE
TOOLS

**Connors and Davis
Sales Corporation**

CIRCUIT AVENUE,
WEST SPRINGFIELD, MASS.

CONNORS AND DAVIS Sales Corp.
508 Circuit Ave., West Springfield, Mass.
Please send detailed information and prices on:

PERKINS SPRING COILER

hand ☐ power ☐

OMNI-VISE #4 ☐ #2 ☐

Name _____ Title _____
Company _____
Address _____ State _____
City _____

new shop equipment . . .

capable of sharpening drills ranging from 0.012 to 0.240 inch. According to the manufacturer, the concentric accuracy of sharpened drills is 0.004 inch or less.

The unit is said to require no special skill to operate. No resetting is needed for grinding different diameters

or types of drills. One quick adjustment adapts the grinder for right or left-hand drills.

For more data circle 92 on Reader Service Card

★ ★ ★

TAPPING AND DRILLING HEAD IS ADJUSTABLE TO ANY PATTERN

Errington Mechanical Laboratory, Inc., Staten Island 4, N. Y., has introduced a universal-

joint adjustable tapping and drilling head which can be adjusted to any pattern of holes and which is available with four or six spindles. According to the manufacturer, it takes less than 1/2 minute to change from drilling to tapping or from tapping to drilling. The head has positive clutch drive and reverse and is made of

CYCLONE SEPARATION

FOR MORE EFFICIENT
DUST COLLECTION
—FILTERS LAST LONGER

Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models ready to use! Reduce installation costs—save space. Write for descriptive literature.

ALSO A COMPLETE LINE
OF MIST COLLECTORS

AGET MANUFACTURING COMPANY
1390 EAST CHURCH ST., ADRIAN, MICH.



Errington Universal-Joint Drilling and Tapping Head

For more data circle 389 on Reader Service Card

THE **CORRECT** BLANCHARD WHEEL
GETS YOUR NOSE OFF THE GRINDSTONE

... WITH **BEST SURFACE
GRINDING RESULTS!**



BLANCHARD SURFACE GRINDERS give you peak production and economy when maintenance is performed on schedule, and when you use the best wheel for each job.

For more than 25 years, Blanchard has been making wheels that do their jobs in less time, with less trouble and cost . . . whether the work is tough as copper or fragile as glass . . . whether it requires heavy roughing cuts or clean-up cuts with flatness of .000005" to .000010" and finish of 1 to 3 micro-inches.

Our quarter century of experience has proven that Blanchard grinders perform best with Blanchard wheels...on every job!

SEND

FOR OUR NEW,
FREE FOLDER
on Blanchard cylinder, sectored and segment wheels — in silicate, resinoid and vitrified bonds.

PUT IT ON THE



THE BLANCHARD MACHINE CO.

64 STATE STREET • CAMBRIDGE 39, MASS., U. S. A.

Gentlemen:

☐ Please send new *Blanchard Wheel and Segment folder*.

NAME _____

TITLE _____

FIRM _____

STREET _____

CITY _____ ZONE _____ STATE _____

For more data circle 390 on Reader Service Card

new shop equipment . . .

cast aluminum with hardened and ground gears and spindles made in one piece. Full grooved ball thrust bearings are located at all thrust points and oilite bronze radial bearings are also used.

The drilling and tapping head is available in two models; namely, the No. 0 and the No. 1. The Model No. 0 has a tap capacity from 0 to $\frac{1}{4}$ inch, minimum distance between spindle centers of $\frac{11}{16}$ inch and a maximum pattern diameter of $5\frac{1}{4}$ inches. The Model No. 1 has a tap capacity ranging from $\frac{7}{32}$ to $\frac{1}{2}$ inch, minimum distance between spindle centers of $1\frac{1}{2}$ inches and

a maximum pattern diameter of 8 inches.

For more data circle 93 on Reader Service Card.

FOR "SPECIAL" CUTTERS AT STANDARD

PRICES!

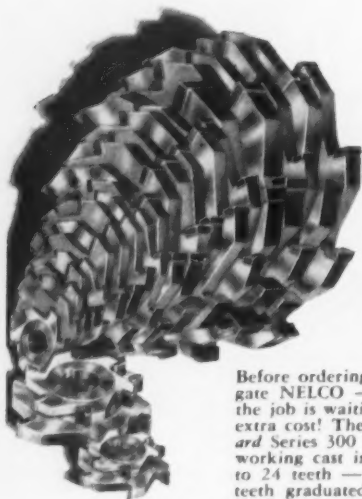


CHECK THE

NELCO

CATALOG!

NEARLY 800 DIFFERENT
NELCO TOOLS ARE
REGULARLY STOCKED TO
FILL 90% OF ALL SPECIAL
TOOL APPLICATIONS!



SEND TODAY FOR
THE NEW NELCO
48 PAGE CATALOG



Before ordering costly *special* cutters, investigate NELCO — chances are the tool to do the job is waiting — without delay! Without extra cost! There are, for example, 47 *Standard* Series 300 Nelco Side Milling Cutters for working cast iron, brass and bronze. 6 teeth to 24 teeth — diameters from 3" to 12" — teeth graduated from $\frac{3}{32}$ " to 1" in width — from 1" to 2" hole diameter. Throughout the entire Nelco line, this same versatility and utility holds true. Other *standard* Nelco carbide tools in stock — saving dollars on special cutters — include

- | | |
|------------------------------------|-------------------------------------|
| 130 Different Side Milling Cutters | 40 Different Face Milling Cutters |
| 37 Different Slitting Saws | 25 Different Shell End Mills |
| 171 Different End Mills | 189 Different Carbide Tipped Drills |
| 21 Different Slab Milling Cutters | |

... and scores of additional cutters for every application

NELCO TOOLS

For that Extra
EDGE in Production

NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT

For more data circle 391 on Reader Service Card

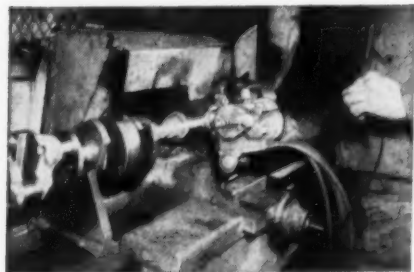
★ ★ ★ TOLERANCE HANDS FOR DIAL GAGES

B. C. Ames Co., 25 Ames St., Waltham 54, Mass., has introduced tolerance hands for use on its line of micrometer dial gages and dial indicators. The tolerance hands are located directly above the dial, un-



Ames Dial Indicator equipped with tolerance hands

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON
METALLIZING ENGINEERING CO., INC.
1111 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.

☐ Please have Metco Field Engineer call.

Name

Company

Street

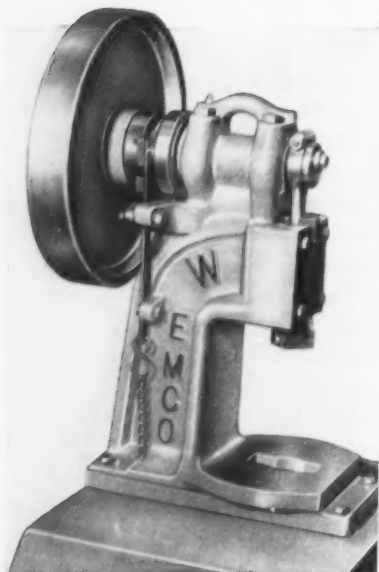
City Zone State



Metallizing Engineering Co., Inc.

1111 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD. - Chobham near Woking, England

For more data circle 392 on Reader Service Card



EMCO "W", bench type, 5-ton; also larger EMCO "X", 10-ton. Both sizes also stand-mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES

are **SPEEDY** and **SAFE**

Versatile EMCO presses excel for punching, forming, stenciling and riveting metal, leather, plastics and other non-metallic materials. Up to 300 operations per minute. "Big machine" speed, strength, rigidity, accuracy, endurance. Compact, fool-proof, simple design—easy to operate. Thousands of EMCOS in money-making use testify to Klaas' dependability since 1921.

Ask for our Bulletin "S-8"

UNUSUAL
AIDS
TO
INDUSTRY

**THE KLAAS MACHINE
& MFG. CO.**
4334 East 49th St.
Cleveland 25, Ohio

KLAAS-BUILT

For more data circle 393 on Reader Service Card

186 modern machine shop

new shop equipment . . .

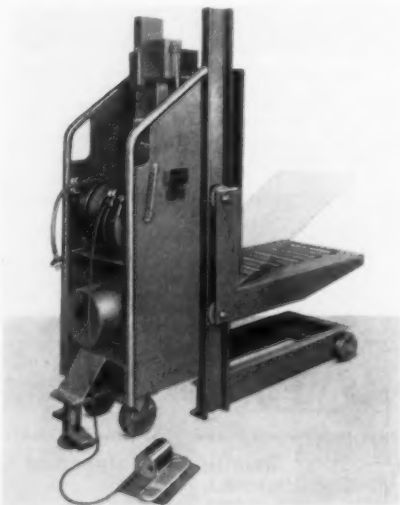
der the crystal, which makes the pointers easy to see and eliminates distortion in reading. It also prevents the hands from being moved accidentally. If desired, the indicator can be sealed to prevent unauthorized changing of tolerance limits.

For more data circle 94 on Reader Service Card

★ ★ ★

POWER-OPERATED STACKER HAS 3,000 LB. LOAD CAPACITY

The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio, has announced a "Portelvator" Power-Operated Stacker which has a load capacity of 3,000 pounds. The unit utilizes a roller-equipped platform measuring 20 x 36 inches with a hinged cover plate. The platform has an operating speed of 58 inches per minute. Platform travel is



Hamilton "Portelvator" Power Stacker

August, 1955



**VISIT BOOTH No. 1221 AT THE
1955 MACHINE TOOL SHOW**

See this production problem solved on a Special Greenlee Bar Automatic. It will be in normal production operation here at the show.



GREENLEE CAN HELP SOLVE YOUR PRODUCTION PROBLEMS

The creative know-how that built this special auger-bit machine is available to you. Make full use of Greenlee specialized engineering skills and ingenuity. Take advantage of its cost saving possibilities.



**write for
further information**

For more data circle 394 on Reader Service Card

new shop equipment . . .

41 inches with a minimum height of 7 inches and a maximum height of 48 inches. Other features of the stacker include electric-mechanical lift through a 3-h.p. crane hoist type motor; worm, worm gear and screw power transmission; reversing magnetic starter; gear-driven limit switch; retractable power

cable on a 15-foot spring reel; and a retractable reversing foot switch on a 25-foot spring reel.

For more data circle 95 on Reader Service Card

★ ★ ★

RADIAL DRILL FEATURES FLAME-HARDENED COLUMN

Designated as the "Hardclad," a radial drilling machine which features a flame-hardened column has been announced by Cincinnati Lathe & Tool Co., 3262 Disney, Cincinnati 9, Ohio. The column is a thick-walled centrifugal casting, accurately turned, surface flame hardened, and then finish ground to close tolerances and a mirror-like finish. In addition to the "Hardclad" column, the machine features two-lever, direct - reading, color-match, spindle speed and feed shift dials. All controls are grouped within easy reach of the operator, including the start-stop push-buttons. An alloy steel, No. 3 Morse taper spindle is mounted in four anti-friction bearings of ample capacity. Nine spindle speeds and six power

2 Seconds

CAN SAVE YOU TWO HOURS!

Adjusting bevel gear mesh with a laminated shim is a matter of two seconds to remove a lamination!

The shim in this case is made of LAMINUM®, our exclusive material. It is a "solid" unit built up of 16 layers of .002 brass. It peels quickly and easily. Each shim removed adjusts the bevel gear position by two thousandths.

You save time by easier machining tolerances on the housing; **you save time** by eliminating pesky assembly machining; **you save** by not tying up a machine intermittently. **IT'S EASIER!**



SEND FOR LITERATURE

SHIM HEADQUARTERS SINCE 1913

Check Our Stampings Division
For Your Stamped Parts Requirements

3308 UNION STREET • GLENBROOK, CONNECTICUT

For more data circle 955 on Reader Service Card



... the preferred dial indicators

TIME-TESTED FOR ACCURACY AND DEPENDABLE PERFORMANCE!

For more than half a century, industry has relied on Ames indicators for help in the solution of measurement problems of all kinds. And through the years, Ames indicators have done their jobs superlatively well. The Ames reputation for extreme accuracy, ruggedness and reliability through many millions of cycles is due to an unswerving dedication to our original guiding principle—to make the best possible indicators and gauges, through constant research and the use of highest quality materials and expert craftsmanship.

We will gladly make recommendations on your measurement problems. Please send blueprints and specifications. And ask for your free copy of the Ames catalog.

Representatives in principal cities



B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle 396 on Reader Service Card

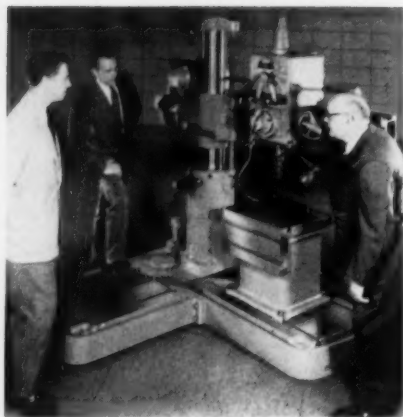
August, 1955

modern machine shop 189

new shop equipment . . .

feeds are provided. All speed and feed shafts are mounted in anti-friction bearings. The entire internal mechanism is forced-spray lubricated.

The 1½-h.p. main drive motor is mounted on the arm to the left of the



Cincinnati "Hardclad" Radial Drilling Machine

**RECLINABLE
POWER PRESSES**



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

***51st** year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

ZEH & HAHNEMANN CO.
190 VANDERPOOL ST. NEWARK 5, N. J.

For more data circle 397 on Reader Service Card

column, providing counterbalance and easy accessibility. Power is transmitted through a silent chain and drive shaft, and no parts of the main drive arrangement are concealed in the head. Safeguards for the operator include the electrical panel built into the back of the arm. A safety switch on the access door prevents exposing a live panel, as it cannot be opened until the switch is in the "off" position. A transformer is provided to reduce line current to 110 volts at the controls. The raise-lower push-buttons are covered by a guard, preventing vertical movement of the arm until the barrel clamp is released. Stability is provided by a waffle-ribbed

WALTHAM SUB-PRESSES
... for precision work



Exact alignment and constant precision can be maintained throughout life of die. Made in 9 sizes. Babbitt bearing is tapered on outside and can be forced downwards. This reduces inside diameter to fit plunger when latter becomes worn through use.

Write for further information.

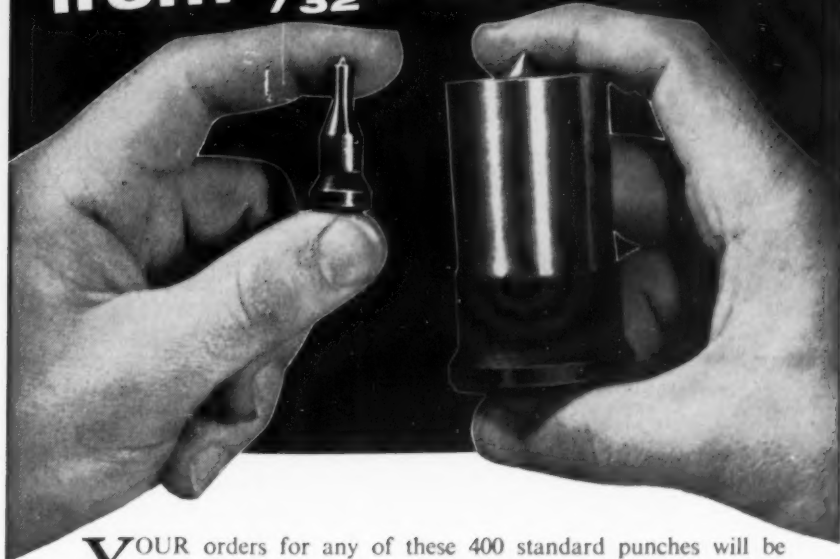
WALTHAM MACHINE WORKS



BOX 48
WALTHAM, MASS.

For more data circle 398 on Reader Service Card

400 Standard Cleveland Punches from $\frac{5}{32}$ " to $1\frac{1}{2}$ "



YOUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization.

AA-495



Diamond Anniversary



Established 1880

POWER PRESSES — FABRICATING TOOLS

City Foundry Division • Small Tool Department

E. 40th & St. Clair Avenue • Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING • OXFORD, O

For more data circle 399 on Reader Service Card

August, 1955

modern machine shop 191

new shop equipment . . .

base of ample floor area and weight. Securely bolted to the base is a column support on which is supported the column.

The radial is a 3-foot arm, 7½-inch column machine with a drilling capacity of 1½-inch in cast iron. The machine can drill to the center of a 77-inch

diameter circle. Accessories, such as coolant, universal or box tables, side bases, and work light, are available.

For more data circle 96 on Reader Service Card

★ ★ ★

MILLING MACHINE BUSHING HOLDS CLOSE TOLERANCES

High milling machine speeds with minimum bushing wear, tool breakage,

bar wear, scoring and chatter are claimed to be possible through the use of a live bushing manufactured by J. G. Jergens Division of Donley Products, Inc., 11106 Avon Ave., Cleveland, Ohio. Maintaining close tolerances at high speeds over maximum periods of time, the live milling machine bushing is said to eliminate freezing of the arbor and allow the use of carbide tools to

specify standard



HALLOWELL

UNIT WORK BENCHES

HALLOWELL FEATURES

2 lengths, 2 widths, 2 heights—
all standard

4 top materials—steel, Presdwood
on steel, ShopTop, laminated wood

Plenty of drawer and cabinet space,
functional design

Use them as individual units or as
continuous benches of any length

Standard units with *standard* accessories permit you to *custom build* Hollowell Unit Work Benches to fit your requirements. Stocked by leading shop equipment dealers. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

For more data circle 400 on Reader Service Card



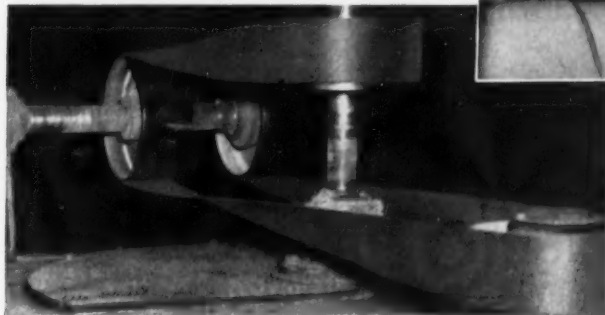
**Jergens Live Milling
Machine Bushings**

INSTANT **SUPPLY!**

A Coast-to-Coast Chain of Warehouses

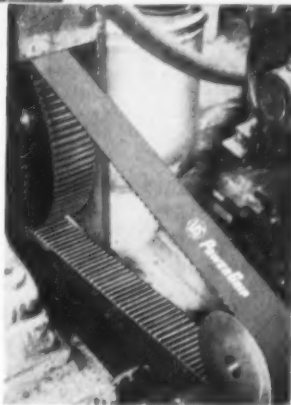


Multiple V-Belts
F.H.P. V-Belts
Sheaves
Flat Belts and
Belting
Special Purpose Belts
PowerGrip "TIMING"[®]
Belts and Pulleys



"U.S." is really geared to deliver. You actually get *immediate* delivery or shipment—thanks to your local "U.S." distributor backed by the strategically located District Sales Offices and transcontinental chain of warehouses. The "U.S." Transmission Line includes flat belts and belting, V-belts, sheaves, and PowerGrip "Timing" Belts and pulleys for any power transmission need.

"U.S." engineers will study your needs for any specialized drives. See one of our selected distributors or contact any of our 27 District Sales Offices or write address below.



"U.S." Research perfects it... "U.S." Production builds it... U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Grinding Wheels • Packings • Tapes • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

For more data circle 401 on Reader Service Card

August, 1955

modern machine shop 193

new shop equipment . . .

full capacity on both new and old milling machines.

According to the manufacturer, the bushing incorporates an absolute seal against coolants and dirt, turns on friction-free roller bearings and is adjustable for wear to maintain close tolerance for long periods of time at high speeds. These features are claimed to eliminate constant adjusting, tighten-

ing and bushing replacement to maintain precision. No machining is necessary to install the live bushing.

For more data circle 97 on Reader Service Card

★ ★ ★

**MARKING MACHINE IS OPERATED
HYDRAULICALLY AND
PNEUMATICALLY**

Designated as the Model 335 "Pneudraulic," a marking machine which is hydraulically operated by oil and given a pneumatic boost to make possible heavy marking in steel flats or rounds by rolling has been announced by Geo. T. Schmidt, Inc., 1806 W. Belle Plaine Ave., Chicago 13, Ill. The machine employs power for both the table and the die slide, thus giving the operator free-

Best friend a gage ever had!



CLIP THIS COUPON

The du MONT CORPORATION, Greenfield, Mass.

Please mail Catalog and Price List S on the Minute Man Magnetic Base with new Universal Joint.

Name

Company

Address

For more data circle 402 on Reader Service Card



**Schmidt Model 335
"Pneudraulic" Marker**

in MILL HEADS

RUSNOK

*Builds the BEST Quality
at the BEST Price*

1/4 H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.
High speed medium-light operation.
For bench, floor and pedestal mills.
Fits milling machines with overarm 1 1/2" to 3".
3/8" end mill capacity.

\$245.00



RUSNOK

1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

RUSNOK

RUSNOK TOOL WORKS

4840 West North Ave., Chicago 39, Ill.

DEALERS IN ALL PRINCIPAL CITIES

MILLING • DRILLING • BORING

For more data circle 403 on Reader Service Card

new shop equipment . . .

dom of both hands. Operation consists merely of setting the table to the desired position and stepping on the foot pedal which actuates both the table and the die slide.

The unit is said to be capable of

marking flats up to 5 inches thick and rounds to 5 inches in diameter. It will mark, according to the manufacturer, four lines of 1/16-inch characters, three lines of 3/32 or 1/8-inch characters, and two lines of 1/4-inch characters in steel. The length of marking on flats, using a knurl or knurl typeholder with interchangeable type, is 3 3/8 inches maximum. The same length holds for

rounds which will rotate in a cradle. Rounds which roll directly on the table can be marked up to 1-11/16 inches in length. Rounds are marked using a straight die or straight typeholder.

A roller bearing cross slide is said to ensure smooth, uniform stroke. The table is constructed with long gibs and is provided with gib adjustment screws. Design of the machine is sturdy and compact with no heavy, overhanging cylinder. Simple die stroke control, quick and easy handwheel adjustment of table and a single conveniently - located pressure control valve make the machine easy to operate. The machine weighs 850 pounds and occupies a floor space of 18 x 20 inches. It stands

Time Savers for the Tool Room and the Production Line!

Do It Faster With A DREMEL MOTO-TOOL

With DREMEL you can polish, grind, de-burr, sharpen without tearing down setups. Moto-Tool is the fastest, most powerful tool in its class. Easy to use as a pencil (dynamically balanced and weighs only 13 oz.). Put the DREMEL to work. See how it pays off in speed, convenience and time savings!

**APPROXIMATELY
27,000 R.P.M.**

MOTO-TOOL NO. 2, with one emery wheel point, . . . \$17.85

MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case . . . \$25.95



See Your Nearby Industrial
Distributor or write for catalog.
DREMEL MFG. CO., Dept. 225-H, Racine, Wis.

For more data circle 404 on Reader Service Card



Putting the finishing touch on new developments at Pawtucket Spinning Ring Co.

To meet the requirements of modern high speed spinning, striking improvements involving advanced manufacturing methods have been made in the spinning and twisting rings of the Pawtucket Spinning Ring Company of Pawtucket, R. I. With it all, Jewel Brand Abrasives continue to be used for applying the *finishing touch*. They produce economically a shiny-smooth surface on the ring faces in keeping with the high calibre of craftsmanship required for precision-finished sections. At the Pawtucket Spinning Ring Company, Jewel Brand Abrasives have

been specified for this purpose over a period of 16 years.

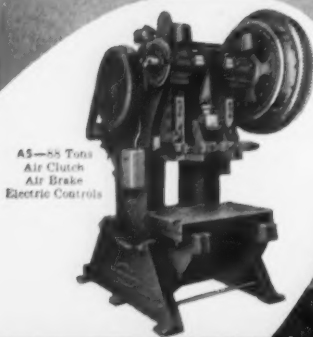
Maintenance of uniformly high quality standards often figures in favor of Jewel Brand Abrasives. Combine this advantage with their longer wear, plus faster, cleaner cutting action, and you have the reason why cost-wise manufacturers turn to Jewel Brand *first for finer finishing*. You can check these advantages so easily. Call your nearby Jewel Brand Abrasive Engineer or Industrial Distributor, or write direct to Abrasive Products, Inc., 507 Pearl St., South Braintree 85, Mass.



For more data circle 405 on Reader Service Card

**Backed by nearly
a half century of
dependable performance**

**... yet modern to the minute
for today's exacting demands.**



AS—55 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

ROBINSON
PRESSES

NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA

*Write for illustrated
brochure and
specification sheet.*

For more data circle 406 on Reader Service Card

new shop equipment . . .

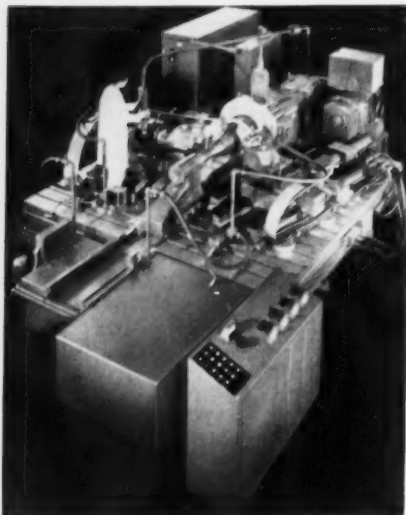
56 inches high overall. Operation is off the shop air line, providing a maximum table pressure of 10,000 pounds at 100 p.s.i. line pressure.

For more data circle 98 on Reader Service Card

★ ★ ★

MACHINE AUTOMATICALLY COLD SPINS CONES AND TUBES

Identified as the Hydrosplin, a heavy-duty machine for cold spinning cones and tubes has been announced by the Process Machinery Division of The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. The standard machine is built in a 42 x 50-inch size, in both plain and duplex models. Special sizes can be supplied to meet customer's requirements. According to the manufacturer, the Hydrosplin has the capacity to cold spin regular contoured hollow



Cincinnati Hydrosplin Machine in use



New GA batch type controlled atmosphere furnace designed for tool rooms and small production. 2 models now ready—others to follow.

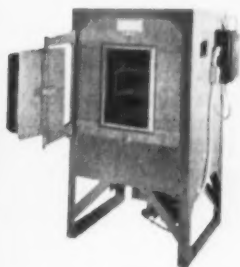
Cooley ELECTRIC HEAT TREATING FURNACES

35 Models

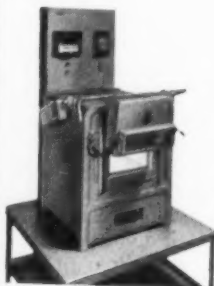
WITH AND
WITHOUT

*Controlled
Atmosphere*

ELECTRIC OVENS



Recirculating Air Draw: box type furnace for controlled heating to 1300° F.—steel tempering, glass annealing, etc. 5 sizes to 24" w. x 15" h. x 48" d.



◀ **Bench Type:** for tools and small parts—to 2000° F. 14 sizes to 10" w. x 8" h. x 18" d.

Recirculating Ovens: for drying, finishing and industrial processing to 600° F. 5 sizes to 36" w. x 36" d. x 60" h. ➡



◀ **High Temperature Box Furnace:** for high speed steel treating to 2500° F. 3 sizes to 12" w. x 8" h. x 24" d.

Industrial Box Furnace for general heat treating—to 2000° F. 4 sizes to 15" w. x 12" h. x 30" d. ➡



Catalog and complete information on any of these furnaces will be gladly furnished on request.

COOLEY ELECTRIC MANUFACTURING CORPORATION

34 S. SHELBY ST. • INDIANAPOLIS 7, INDIANA

For more data circle 407 on Reader Service Card

new shop equipment . . .

cones and tubes up to 42 inches in diameter x 50 inches long. Roll force, which may result in unit pressure as high as 400,000 p.s.i., is said to be sufficient to roll a 3/4-inch flat disc of A.I.S.I. 4130 steel down to a 60-degree included angle straight-wall cone in one pass. Parts may be spun from flat discs, preformed blanks or rings of vir-

tually any ductile metal. Mill-rolled sheet and plate stock, forgings and castings may all be used for Hydrospringing. Besides giving the part the desired shape, Hydrospringing usually increases its resistance to fatigue failure and increases the tensile strength and hardness of the material.

The Hydrospring machine consists primarily of a heavy, welded steel bed which rigidly supports the headstock, tailstock and the main slide units. A duplex machine has two main slides,

while a plain machine has one. T-slots in the bed permit universal positioning of the main slides which support the roller carriers. The hydraulically powered roller carriers are independently controlled and may be traversed simultaneously or individually, depending upon the spinning operation. By placing the slides parallel to each other so that the rollers are opposed, tubes up to 42 inches may be formed. Cones of any included angle may also be formed—often in one pass. Dishing or beading operations on disc-shaped parts may also be performed.

When production warrants, the machine may be

Look at the operations they perform!

**MODERN
FEDERAL
DIAL FEEDS**

- Drawing ■ High Speed Marking
- Crimping ■ Riveting ■ Forming
- Stamping ■ Assembling
- Punching ■ Broaching
- Piercing ■ Burnishing
- Burring ■ Staking ■ Wiring.

No. 7 Dial Feed—Capacity 80 tons.

Write for new Catalog


Versatile? Yes! They'll also perform many operations unique to your plant. Automation is today's watchword! Modernize with Dial Feeds—and watch production go up, costs go down. Federals reduce accidents, cut down-time, eliminate expensive equipment. Precision-built. Finest materials. Available in sizes 6 to 80 tons. Automatic feeds and ejectors, if desired.

THE FEDERAL PRESS COMPANY, 594 Division Street, Elkhart, Indiana

FEDERAL DIAL FEED PRESSES

30 Years of Quality Construction


For more data circle 400 on Reader Service Card



SOLID CHUCKING
REAMERS




EXPANSION REAMERS



SHELL-TYPE
EXPANSION REAMERS



CORE DRILLS



STUB SCREW MACHINE
REAMERS (SOLID AND
EXPANSION TYPES)



SHELL END MILLS



END MILLS



COUNTERBORES,
SPOTFACERS

Write for the Staples
Standard Tool Catalog

each a specialist
in cost cutting

Staples

CARBIDE-TIPPED CIRCULAR TOOLS

Your economy begins — and work quality improves — when you specify Staples carbide-tipped circular tools. They have established an enviable reputation throughout industry for delivering top-profit performance on every job.

A complete range of standard tool designs and sizes is available for quick delivery from stock. For your special tools, submit your specifications and prints for a prompt quotation. You'll be making the most of your standard and special tool investment when you put Staples Tools to work in your production.

Staples

CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide-Tipped Tools, Expansion Reamers — Special Tools

THE STAPLES TOOL COMPANY, CINCINNATI 25, OHIO

For more data circle 409 on Reader Service Card

August, 1955

modern machine shop 201

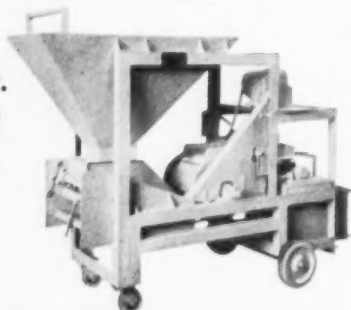
new shop equipment . . .

set up to operate through a cycle in which the movements of the saddles, cross slides and tailstock and starting and stopping of the spindle are all automatically controlled. To facilitate setups, the machine may be operated manually by push-buttons. Depending upon the spinning requirements, the Hydros핀 may be equipped

with a 50 to 60-h.p. infinitely-variable speed drive to the heavy-duty spindle. The spindle is carried in tapered roller bearings designed to support both radial and thrust loads. High peripheral loads on the 36-inch diameter face plate may be supported through the use of an outboard roller mounted on the side of the headstock. The tailstock, which holds the workpiece and mandrel rigidly on center, is hydraulically actuated. It may be positioned within 20 inches minimum to 100 inches maximum from the face plate.

Feed rates for both the saddle and cross slide are hydraulically controlled and infinitely variable. Two 7½-h.p. motors drive the hydraulic pumps which provide the power for these movements. Longitudinal feed rates are infinitely variable between 0 and 60 inches per minute when one slide is used and 0 to 30 inches per minute when both slides are used. Cross slide feed rates vary from 0 to 54 inches per minute using one slide and 0 to 27 inches per minute using both slides. Power rapid retraction is provided for the longitudinal slide, cross slide and

**Separates 7 cu. ft.
load of parts and
tumbling chips in
Just 10 minutes**



STEARNS MAGNETIC PARTS SEPARATOR

You can separate steel parts from deburring chips in minutes instead of hours with a Stearns Magnetic Parts Separator. As mixture cascades from feeder, powerful Stearns Drum-Type Magnet lifts parts to belt which conveys them to demagnetizer. Non-magnetic chips fall into suitable receptacle for re-use.

Check These Special Features

- Non-Choking Adjustable Feeder
- Parts Fully Demagnetized
- Completely Self-Contained Unit
- No Operating Expense — No current needed.
- Positive Separation — Lift principle eliminates entrapment.
- Protection for Parts — Hopper is rubber-lined, feeder rubber-lined.

Find out how a Stearns Parts Separator can cut your handling costs. Write today for Bulletin 110.

MAGNETIC EQUIPMENT

FOR ALL INDUSTRY

STEARNS

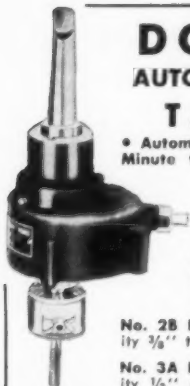


MAGNETS

664 SOUTH 28TH STREET

MILWAUKEE 46, WISCONSIN

For more data circle 410 on Reader Service Card



DORMAN AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to $\frac{3}{8}$ " in Steel — $\frac{1}{2}$ " in Aluminum.

No. 2B POSITIVE TAPPER — capacity $\frac{3}{8}$ " to $\frac{7}{8}$ " in Steel.

No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel — $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

• PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from
\$50.00
Write for
Bulletin
**IMMEDIATE
DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION

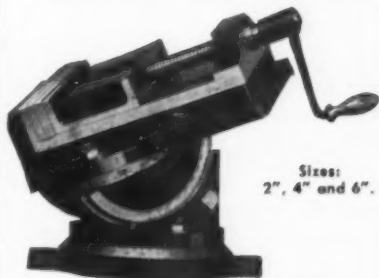
Division of Thomson Industries, Inc.

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 411 on Reader Service Card

TOOLMAKERS!



Sizes:
2", 4" and 6".

NOW SET-UP FASTER--

Save time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for Circular

DONOVAN MFG. CO.
80 BATTERYMARCH ST., BOSTON 10, MASS.

For more data circle 412 on Reader Service Card

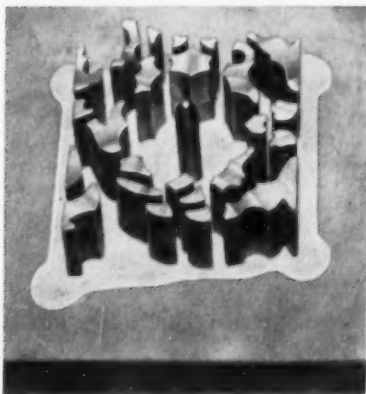


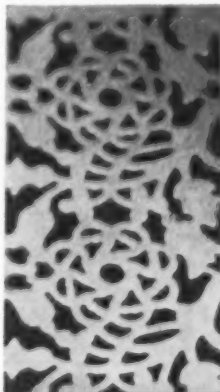
Photo courtesy Stebbins Tool & Die Co.

SKEPTIC BECOMES ENTHUSIAST

ANOTHER skeptical prospect now an enthusiastic customer. 60 hours time saved by using 5 pounds of Cerromatrix and "The Method" in building this complicated perforating die for .020" thick, half hard brass. Die still in perfect condition after producing over 100,000 pieces.

Die made by Stebbins Tool & Die Co., Bronx, for Embassy Metal Products Co., New York.

Save time with Cerromatrix—write for Booklet—Cerromatrix Method of Punch & Die Setting. And when you buy, insist on genuine Cerromatrix. There's a difference.



CERRO DE PASCO CORPORATION

Dept. 10, 40 Wall St.

New York 5, N. Y.

For more data circle 413 on Reader Service Card

new shop equipment . . .

tailstock. The roller carriers on the machine are so designed that tools may be changed quickly and easily. Two swivel mounted carriers are supplied.

Available for use with the Hydros-pin is a hydraulic contour tracing attachment. With this attachment mounted on the cross slide, parts with curviline-

ar wall sections or multiple diameter tubes may be formed, as well as parts having straight sides.

For more data circle 99 on Reader Service Card

★ ★ ★

MACHINE DEBURS AND CHAMFERS INTERNAL GEARS

Designated as the BMI-15, a universal Burr-Master for the deburring and chamfering of internal splines.

straight-sided or involute-form helical and spur gears ranging in size from 2 to 20-inch pitch diameter with a maximum of 4 diametral pitch has been announced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. Throat clearance permits the handling of parts having up to a 22-inch outside diameter. For high volume production of internal gears or splines, the machine can be supplied with automation. It is built to J.I.C. standards and handles production quantities of internal gears or splines. A spline driver is used for gears up to 6-inch pitch diameter with a drive gear being used for

1200 ^{3/4"} TUBE ENDS PER HR.

Deburred AND Faced

ON PINES END-FINISHING MACHINE

At Tube Processing, Inc., Indianapolis, the Pines No. 600 End-Finishing Machine, illustrated at right, is today performing combination facing and inside and outside deburring operations on $3/4"$ x .035" x 15" steel tubes at average

net production rates of 1200 tube ends per hour. On smaller jobs, $1/4"$ and $3/16"$ steel tubes, net production averages up to 2000 ends per hour. The machine is equipped with air-operated clamp and foot pedal control.

Fast, Accurate Work

These outstanding performance records are typical of fast, accurate results achieved in other plants on all kinds of deburring, facing, chamfering, pointing, and reaming operations. This is because the machine is designed to clamp and feed work to the rotating cutters in one pass. This enables the operator to work more efficiently with less fatigue. Small and compact, the Pines No. 600 handles stock diameters up to 2". Maximum feed stroke is $1-1/4"$. Larger models for stock sizes up to 5" are also available.



PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 644 WALNUT - AURORA, ILLINOIS

PRODUCTION BENDING - DEBURRING - CHAMFERING MACHINERY

FREE BULLETIN

Write for facts on how these machines cut production costs.



For more data circle 414 on Reader Service Card

Small TAPER PINS

Diameter up to .125" — Length up to 1"

Hardened and Ground

Taper Tolerance .0001" In Length Of Pin

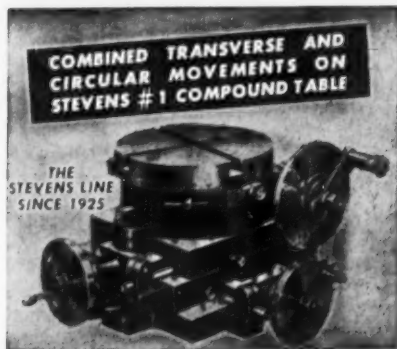
Diameter Tolerance .0005"

Send Specifications for Quotations

COMMERCIAL CENTERLESS GRINDING CO.

5605 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

For more data circle 415 on Reader Service Card



Combines $3\frac{3}{4}$ " longitudinal and $3\frac{3}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

For more data circle 416 on Reader Service Card

August, 1955

For Arbor Spacers and Shims,
Feeler Stock or Shim Stock...

specify top-quality



ARBOR SPACERS AND SHIMS

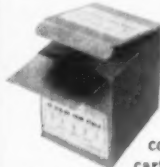
20 arbor sizes $\frac{1}{8}$ " to 4" . . . 19 thicknesses .001" to .125".

Specify with or without keyways. Also available—hardened and ground spacing collars (with standard keyway) $\frac{1}{8}$ " to 3" long in all popular sizes. (For use in milling, slitting and gang-saw setups, shimming gears and bearings.)

FEELER STOCK

Made from tempered stock, rolled to close tolerances.

$\frac{1}{2}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips $\frac{1}{2}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)



SHIM STOCK

Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in assortment package of 12 thicknesses .001" to .015".

For details and prices,
write for descriptive literature.



Detroit Stamping Co.

349 MIDLAND AVE. • DETROIT 3, MICH.

For more data circle 417 on Reader Service Card

modern machine shop 205

new shop equipment . . .

larger sizes. The unit is said to chamfer both sides of the tooth and the root at one time at the rate of five teeth per second. In addition, it can also be used to deburr and chamfer certain types of external gears with adaptations in the tooling.

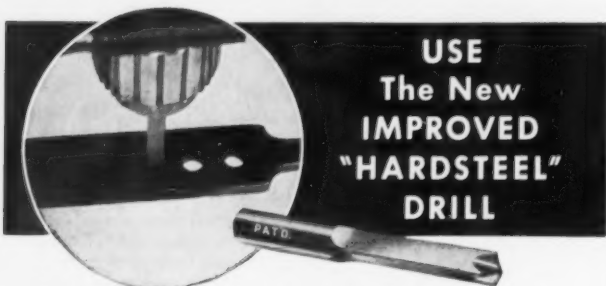
An infinitely variable depth of cut-

ting stroke, it is claimed, assures maximum operating efficiency. When production must be shifted from one gear to another, it can be accomplished readily. The only tooling components that need be changed are the spline driver, work-holding fixture, toolholder and form tool. The change gears must also be changed if the number of teeth change. Use of a three or four cutting edge, circular-type form tool for deburring and chamfering ensures long

life and reduces the time required to get a sharp cutting tool into position. When one cutting edge becomes dull, the tool need only be rotated to present a sharp cutting edge.

According to the manufacturer, even an inexperienced operator can maintain a high production rate on the machine. The part is placed in the

Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—
With "HARDSTEEL"**

BLACK DRILL COMPANY, INC.

1372 East 222nd St. • Cleveland 17, Ohio

Also makers of —
**BLACK DRILLING
UNITS — AUTOMATIC,
SELF-CONTAINED —
FOR COST-CUTTING
PRODUCTION ON
ALL MATERIALS**

Write for information



**Burr-Master BMI-15
Internal Gear Chamfering Machine**

For more data circle 418 on Reader Service Card

SLASH Production Costs with HIGH SPEED HAMMER!

40 Years of Know-How . . .
Yours for the Asking

ASSEMBLY PROBLEMS? Let High Speed help find the solutions. Unique engineering and tooling service yours without cost. Send samples of job to be assembled and/or prints. Complete analysis by return mail.

Or, ask for full information on High Speed Staking Machines and Riveters. Full range of models, bench and pedestal types, motor, foot or air operated. Wire or call today!



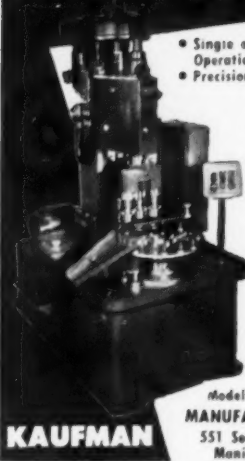
Write or Call CONgress 6470 Today!

HIGH SPEED HAMMER CO., INC.
315 Norton St., Rochester 21, N. Y.

For more data circle 419 on Reader Service Card

KAUFMAN TAPPING MACHINES

BUILT FOR SPECIFIC PRODUCTION JOBS



- Single or Multiple Head Operations
- Precision Depth Control
 - Non-reversing Motor Drives
 - Pressure Lubricated Lead Screws
 - Fast, Accurate Rugged Index
 - Other Head Units Available
 - Other Worthwhile Features.

Catalogs Nos. 754 and 1153
Mailed on Request.

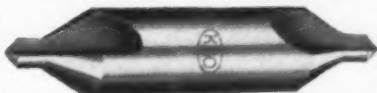
Model 75-24

KAUFMAN MANUFACTURING CO.
551 So. 29th Street,
Manitowish, Wis.

For more data circle 420 on Reader Service Card
August, 1955

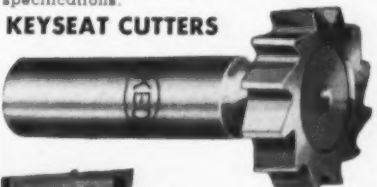
KEO

CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand $\frac{1}{4}$ " shank. Diameter from $\frac{1}{4}$ " to $1\frac{1}{4}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



CENTER REAMERS

High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from 1- $\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

For more data circle 421 on Reader Service Card
modern machine shop 207

new shop equipment . . .

workholding fixture and located radially. The spline driver (or drive gear) is fed down into the part by the quill lever while the operator retards the lock lever with his other hand. The quill must be brought all the way down to energize the dual start buttons that

start the cutting cycle. After one complete revolution of the workpiece, the cycle timer stops the cutters in the retracted position to simplify unloading, and a green indicator light on the control panel signals that the part is completely deburred and chamfered. The operator then releases the quill unlocking lever and raises the quill withdrawing the driver and unloads the finished part.

All shafts, pulleys, and so on, are mounted in life-time lubricated anti-friction bearings. Bearings that are not sealed for life are lubricated by a Trarbon centralized lubrication system. Gearing in the rocker arm assembly runs in a continuous bath of oil. Coolant is not required for machining, but the BMI-15 is designed to incorporate coolant for flushing chips if this optional feature is required. The overall height of the machine is 80 inches with a 38-inch work height. It weighs approximately 2,500 pounds and requires a 38 x 46-inch floor space.

For more data circle 100 on Reader Service Card

JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 14 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 422 on Reader Service Card



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

For more data circle 423 on Reader Service Card

GEARED HEAD LATHE COMBINES POWER WITH ACCURACY

Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill., has announced the Sebastian 15-Inch Geared Head Lathe which is designed to combine rugged power with toolroom ac-

★ ★ ★

THOMPSON'S

OPEN-SIDE GRINDING WHEEL DRESSER



This Modern Wheel Dresser operates on a resilient bushing. It offers lower initial cost, sharper tools and a smooth shock-proof dressing action. For the sake of economy, each toolmaker should have his own dresser, as well as one at each grinder.

THOMPSON MFG. CO. P. O. Box 627
Erie, Pa.

For more data circle 424 on Reader Service Card

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

MODEL 70

MULTI-WHEEL NUMBERING MACHINE

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly... neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Can be furnished in 1/32" to 3/4" high figures, sharp face gothic or shaded roman style.



Hand shank illustrated. Press shank for foot or power presses also available.

Write for Bulletin M5-70.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

REID

Tool Room Accessories C.I. Hand Wheels

Fine grain cast iron. Rims and handles are ground and polished to high lustre. Top quality. Many sizes. Low prices.



COUNTER BALANCED

There's a wide line of REID Accessories such as C.I. Hand Knobs, Machine Handles, Ball Handles, Spherical Washers and many other items at low prices.



SOLID WEB

FREE
NEW 56-Pg.
CAT.

REID TOOL SUPPLY CO.
MUSKOGON HEIGHTS, MICHIGAN

For more data circle 425 on Reader Service Card For more data circle 426 on Reader Service Card

The
"MASTER
COMPAR"

INDICATING MICROMETER COMPARATOR

has the

VISIBLE feel

No Arguments as to correctness of reading due to "feel"
Use it as Comparator, Master Micrometer, Go & No Go Gage.

1" Range reading in 1/10,000"

To attain permanent accuracy at these close limits, highest precision workmanship and exclusive design of mechanism are of Major Importance and ONLY found in "MASTER COMPAR."



Ask for Illustrated
Circular — Code GIOFF
Sold thru Tool Supply Houses
Ask for Demonstration



0-1" SIZE
IN HARD-
WOOD CASE

\$95⁰⁰

Also Available
in LARGER SIZES

A RIGHT HAND TOOL

Release button for movable Anvils on RIGHT Hand side enables you to hold tool the conventional way.

NEW — Resetting to Zero in 5 seconds

Quick adjustable tolerance hands. Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness and Taper.

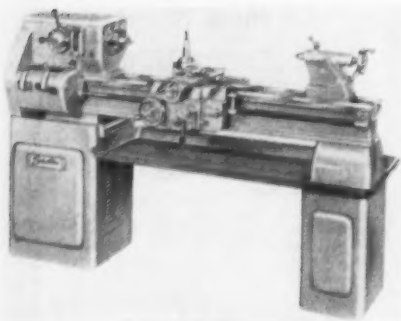
GEO. SCHERR CO., INC.

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

COMPLETE LINE OF
PRECISION INSTRUMENTS

For more data circle 427 on Reader Service Card

new shop equipment . . .



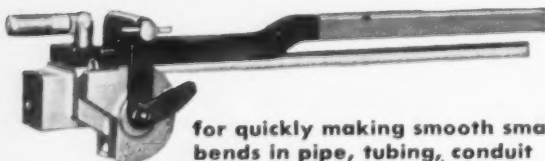
Sebastian 15-Inch Geared Head Lathe

curacy. Outstanding features of the machine include a wide, heavy bed; an anti-friction bearing headstock with "zero precision" tapered roller bear-

ings supporting the spindle; a cam-action tailstock clamp; and an easy shifting spindle speed dial. All controls are centrally grouped within instant reach of the operator. The spindle is thick walled with multiple splines for strength and rigidity. The long tapered key drive nose is furnished as standard. All gears in the headstock run in oil, are extra wide and are designed for quiet, efficient operation. The gearbox is large and has 60 different pitches and feeds. The leadscrew reverse lever is built into the gearbox and permits the operator to change the direction of the lead screw during the time the lathe is running.

A cam action tailstock clamp is said to permit rapid release and instant locking of the tailstock. The carriage is massive and has an unusually large bearing surface. A built-in one-shot oiling system provides lubrication for all bearing surfaces. Two friction disc-type

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 1444 Herbert Avenue, Rockford, Illinois.



For more data circle 429 on Reader Service Card

Over 85% of the torque wrenches used in industry are

Sturtevant TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

In inch grams
...inch ounces
...inch pounds
...foot pounds

Every manufacturer,
design and production
man should have this valuable data. Sent upon request.

P.A. **Sturtevant Co.**
ADDISON QUALITY TOOLING

For more data circle 429 on Reader Service Card

Chatterless!

use
NOBURSINK
for... Unequalled
Performance



NOBUR
TOOLS

- in
- Deburring
 - Chamfering

NOBUR MANUFACTURING CO.
717 No. Victory Boulevard, Burbank, California

For more data circle 430 on Reader Service Card

August, 1955



TO BE SURE OF
QUALITY
Remember
the Name ↓

HOGGSON

**STEEL
STAMPS**



CHAMFERED
CORNERS
for locating
the base

**FINEST
STEEL**

long
life



ALSO IN
REVERSE
FOR
MOLDS
& DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Connecticut

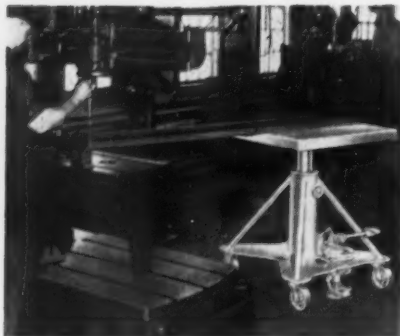
For more data circle 431 on Reader Service Card

modern machine shop 211



PORTABLE

ELEVATING TABLE



1. POSITIONS WORK

at proper height for machining or attaching

2. SUPPORTS LONG PIECES

during drilling and machining operations.

3. HANDLES DIES

simplifies die transfer, installation, removal.

Does all these—and more! Hydraulically operated, highly portable. 2,000 lb. capacity. Standard Model elevates 28" to 44"; Telescopic, 28" to 50".

Write for Bulletin 233.

The RAYMOND CORPORATION

8875 Madison St., Greene, N.Y.

For more data circle 432 on Reader Service Card

212 modern machine shop

new shop equipment . . .

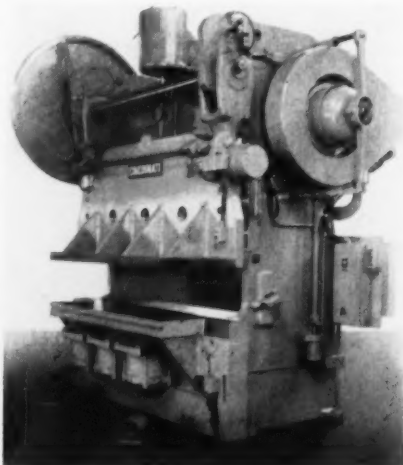
clutches in the apron provide power longitudinal and power cross feeds. These clutches can be engaged individually or simultaneously. The pedestal leg houses a cabinet for the convenient storage of tools and accessories.

For more data circle 101 on Reader Service Card

★ ★ ★

PRESS BRAKE CAN BE USED FOR SHALLOW DRAW WORK

The Cincinnati Shaper Co., Cincinnati 25, Ohio, has announced an All Steel Press Brake which can be used for shallow draw work and various types of press operation. The machine has a 36-inch permanently wide bed and ram with a shut height of 15 inches, an 8-foot overall die surface and six 12-inch air cushions mounted on the underside of the bed, both front and back. The press brake weighs approximately 17 tons and is equipped



Cincinnati All Steel Press Brake for draw work

August, 1955

WHOOOEE!

YOU DON'T HAVE TO LOOK
FAR TO DISCOVER
W. H. O. *
IS TOPS IN
THE PRECISION
SCREW MACHINE
PRODUCTS
FIELD.



CAP SCREWS
COUPLING BOLTS
SET SCREWS
MILLED STUDS
... our specialty.

* **Wm. H. Ottomiller Co.** YORK, PA.

For more data circle 433 on Reader Service Card

NIELSEN
Heavy Duty
Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
on live centers

NIELSEN, INC. LAWTON, MICHIGAN

For more data circle 434 on Reader Service Card

People work better when they SEE BETTER

3-D Girl at SKF

Magni-Focuser multiplies the power of this girl's eyes as she inspects a tiny ball bearing at SKF Industries, Inc.



MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. 480 Lexington Ave.,
Dept. P, New York 17, N. Y.

For more data circle 435 on Reader Service Card

new shop equipment . . .

with an electric clutch with automatic stop and non-repeat. The two foot pedals are arranged to operate as one unit or can be operated separately. The interlocking feature of the foot pedals is said to ensure safety, especially in multiple press operations. Additional features of the press brake include a

special two-speed transmission operating at 13 and 30 strokes per minute, an air counterbalance and a 5-inch stroke. For more data circle 102 on Reader Service Card

★ ★ ★

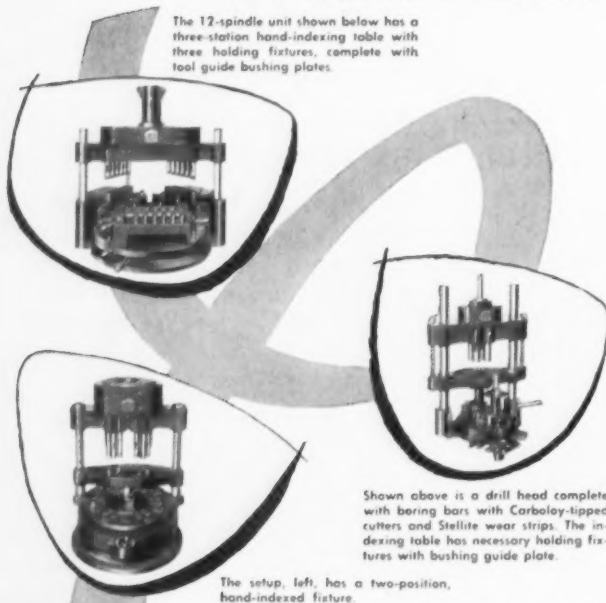
MACHINE CUTS TWO MITERS IN ONE CYCLE

Designated as the Model DM-10, a double miter cutting machine which is designed to cut two 45-degree miters in one fast, pneumatic, fully automatic cycle has been announced by Stone Machinery Co., Inc., Manlius, N. Y. Said to be ideal for high volume production, the machine is capable of cutting aluminum, brass and copper extrusions, as well as plastics. The machine is activated by foot pedal valve



Stone DM-10 Double-Miter Metal Cutting Machine

**IT'S SAFER TO BUY
DRILL HEADS, FIXTURES
and BUSHING PLATES
AS A COMPLETE PACKAGE**



The 12-spindle unit shown below has a three-station hand-indexing table with three holding fixtures, complete with tool guide bushing plates.

Shown above is a drill head complete with boring bars with Carbide-tipped cutters and Stellite wear strips. The indexing table has necessary holding fixtures with bushing guide plate.

The setup, left, has a two-position, hand-indexed fixture.

Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.



UNITED STATES DRILL HEAD COMPANY

616-618 BURNS STREET • CINCINNATI 4, OHIO

For more data circle 436 on Reader Service Card



MARK OF QUALITY

STANDARD TAPER PINS



• The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bar stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.

Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.

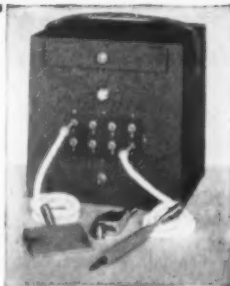
BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 437 on Reader Service Card

MARK IRON, STEEL and CARBIDES



THE
Etchograph
WAY

Original Electric Etcher, Thousands in Daily Use
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

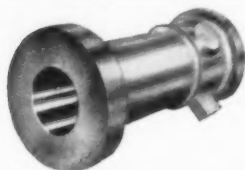
• Write for circulars and prices.

BREWSTER-SQUIRES CO.

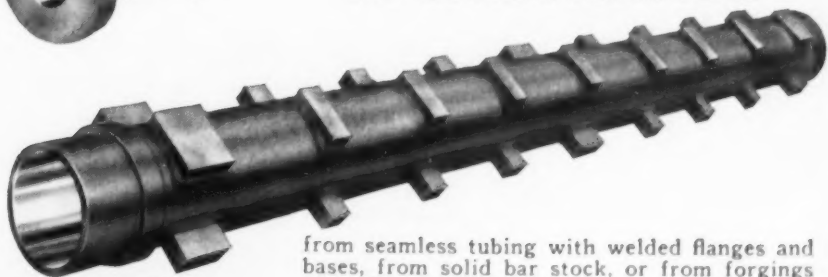
P. O. Box 601

Englewood, N. J.

For more data circle 438 on Reader Service Card



Bored and Honed Parts TO SPECIFICATION



from seamless tubing with welded flanges and bases, from solid bar stock, or from forgings with flanges and pads forged integral—heat treating to specified physicals. Close tolerances rigidly maintained. Send drawings for estimates.

MANUFACTURERS OF HYDRAULIC CYLINDERS • SPINDLES • SLEEVES
CLUTCH SHAFTS • PISTON RODS • RAMS • QUILLS, ETC.

AMERICAN HOLLOW BORING CO.

1955 Raspberry St.,

Erie, Pa.

For more data circle 439 on Reader Service Card

new shop equipment . . .

control and completes a full cutting cycle in less than two seconds. Safe and easy to operate, the machine has an automatic, double work-clamping device which can easily be adjusted to any size or shape of stock.

The Model DM-10 has a capacity for cutting extrusions measuring $2\frac{3}{8}$ inches wide x 2 inches high and 2-inch tubing in non-ferrous metals. Accord-

ing to the manufacturer, the saw produces a finished piece with every cut, and the foot control minimizes operator fatigue and increases the efficiency of the cutting operation. The machine weighs 500 pounds and occupies a floor space of 32 x 36 inches. Work support height from the floor is $37\frac{3}{4}$ inches. The machine is supplied complete with two motors, four Si-Maloy steel saw blades, pneumatic oil mist spray for long wheel life and spacing devices for fine adjustment of blades.

For more data circle 103 on Reader Service Card

MAKE HARDNESS TESTS
With The
KING PORTABLE
BRINELL

Puts a load of 3000 kg. on a 10 mm ball. Can be used in any position — even upside down. Removable test head for testing very large parts. Guaranteed to make accurate Brinell tests. Throat: 4", gap 10", wt. 26 lb.

ANDREW KING
Box 606-H Ardmore, Pa.



For more data circle 440 on Reader Service Card

★ ★ ★

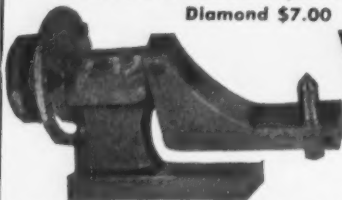
SPECIAL MACHINE PROCESSES DIE-CAST SEGMENT SUPPORTS

Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio, has announced a special drilling, reaming and tapping machine which processes die-cast segment supports for an electric typewriter. The machine is a four-station index type. At the first station, 10 holes are drilled—four in the top face

Get a better "SURFACE GRINDER" job at less cost
QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET

RADIUS DRESSER \$39.00

Diamond \$7.00



Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—\$44.00. Diamond \$7.00.

SPECIAL 20" Wheel Size \$110.00.

ANGLE DRESSER \$44.00

Diamond \$7.00



Ball Thrust Bearing. 24
Precision Ground Surfaces. Can be set
very accurately with a Protractor or
Sine Bar. Works underneath the wheel.
Large bearing surfaces.

The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 441 on Reader Service Card

THE VISE WITH A THOUSAND GRIPS



'FLEXIBLE JAWS' grip all shapes. Grips secure and positive for precise milling, drilling and cutting operations. Eliminate the time and expense of blocking and shimming irregular pieces for toolroom machining. Applicable on any machine tool. Try it in your shop. Save time and dollars on small production runs.

At the Chicago and Philadelphia Shows
(Booth 912) (Booth 2047)

WRITE FOR INFORMATION TODAY!



AMERICAN POSITIVE GRIP VISE CORP.

6-D Olivine St., Williamsett, Mass.

For more data circle 442 on Reader Service Card

**MORE PARTS
PER HOUR
with**

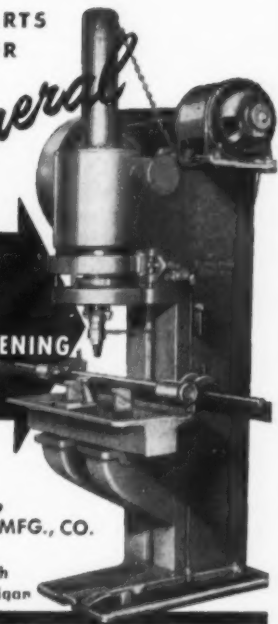
General

**FLEXIBLE-
POWER
STRAIGHTENING
PRESSES**

Let Us
Prove It!

General MFG., CO.

6433 Farnsworth
Detroit 11, Michigan



For more data circle 443 on Reader Service Card

BIG SAVINGS

- Cleaning and finishing metals, molds, forgings, plastics, etc.
- Removing burrs, carbon, rust, grime, paint, etc.
- Stenciling letters, designs, trademarks, etc.

Leiman Sandblasts provide the fast, low-cost, safe, uniform way to perform the operations listed above . . . whether mass production or single pieces, large or small. Easily operated by unskilled help. Well-designed, rugged, last for years, priced right.

Cabinet Type LEIMAN SANDBLAST



FEATURES:

- Continuous vacuum abrasive feed
- Heavy gauge welded steel cabinet
- Doors at each end
- Two arm holes with rubber gloves
- Two interior lights
- Foot pedal control
- Large viewing glass
- Use all abrasives

Write for folder and prices

LEIMAN BROS., Inc.

149 Christie St., Newark 5, N.J.

For more data circle 444 on Reader Service Card

new shop equipment . . .

of the support and six more holes 90 degrees from the top. At station No. 2, a vertical head reams two holes 0.122 inch in diameter and taps simultaneously four No. 10-32P holes in the out-

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



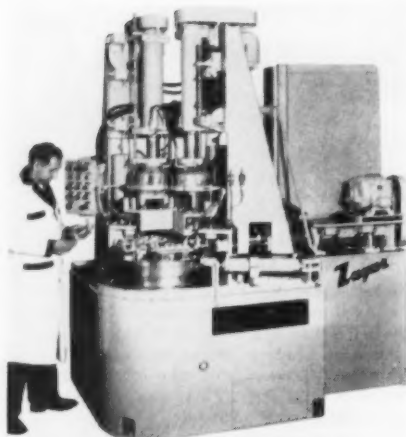
**NO OTHER GAUGE
COMPARES FOR
FAST, ACCURATE
LAYOUT AND
MEASURING**

Capacities to
6" when used
with this
Fairfield Gauge
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

FAIRFIELD GAUGE COMPANY
172 Herbert Street
BRIDGEPORT 6, CONN.

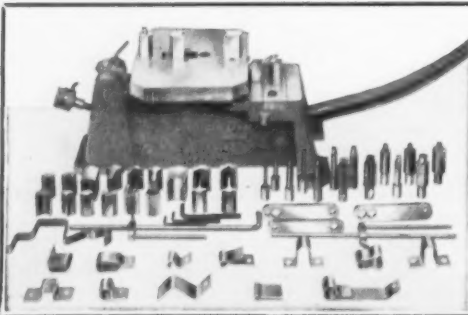
For more data circle 445 on Reader Service Card



*Zagar Drilling, Reaming and Tapping Machine
designed for processing typewriter supports*

er face of the casting. Thus, the part is processed from two directions; namely, from the top by vertical heads and from the side by horizontally-mounted heads.

The heads are a standard basic Zagar design, and the feeds of the heads are by hydraulic units, each having a 10-inch stroke. The tapping head has a lead screw for precise control. The indexing table is of standard design, actuated by a standard air cylinder for automatic cycling. A shot-pin assembly positions the table. In addition, the



Multiform BENDER CUTTER

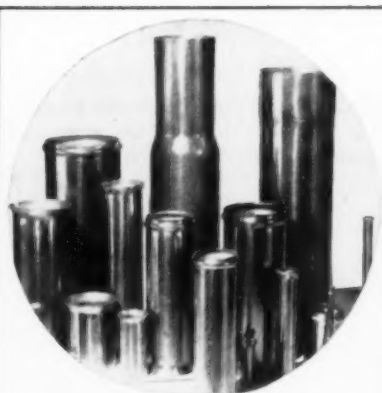
Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO
1/4" to 4" MATERIAL**

Write for brochure which illustrates
and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

For more data circle 446 on Reader Service Card



VAILL

TUBE-END FORMING
*provides for practical,
 economical product
 improvement . . .*

VAILL Equipment offers a cost-cutting, versatile means of shaping and forming tube ends. It has proved in many plants to be the practical means whereby manufacturers can carry out their plans for product improvement.

This complete line of Tube-End Forming Machines includes types for single and multiple operations as well as air-, hydraulic- and mechanical-operated machines. All are designed for easy, fast and inexpensive tooling. Every variety of tube-end forming operation can be met by Vaill. Investigate NOW! Submit your problem.

Send for Bulletin G-3 showing typical tube-end forms and the various types of VAILL machines for handling the shaping and forming.

The
VAILL ENGINEERING COMPANY
 133 E. Main St. • Waterbury 20, Conn.



For more data circle 447 on Reader Service Card
 August, 1955

DEPENDABLE ACCURACY



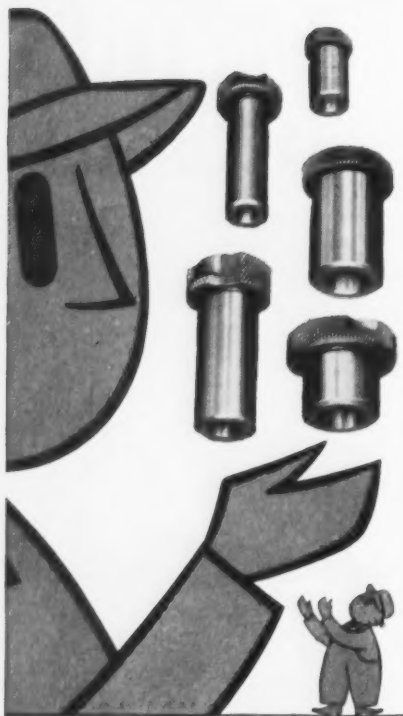
INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

Surface Plates — Box Parallels
 Slotted Angle Plates
 Universal Right Angles
 Flat Parallels — Lapping Plates
 Toolmaker's Knees — "V" Blocks
 Straight Edges (Bridge Type)
 Straight Edges (Leveling Type)
 Measuring Irons
 Masterangle Plates
 Angle Attachments

Send for Bulletin

ACME TOOL CO.
 73 W. Broadway, New York 7, N. Y.

For more data circle 448 on Reader Service Card
 modern machine shop 219



UNIVERSAL DRILL BUSHINGS

**Industry's
standard of
quality and
service**

**UNIVERSAL
ENGINEERING COMPANY**

189-B

FRANKENMUTH 9, MICHIGAN

For more data circle 449 on Reader Service Card

220 modern machine shop

new shop equipment . . .

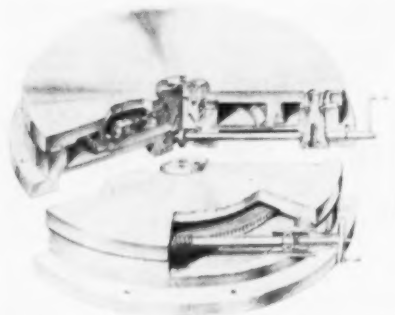
table is tied to the drill heads by guide pins. The machine is fully automatic with safety provisions.

For more data circle 104 on Reader Service Card

★ ★ ★

HEAVY DUTY INDEX TABLE IS POSITIVE LOCKING

Sesco Inc., 8881 Central, Detroit 4, Mich., has announced a positive locking index table which can be hand or power operated and which is designed for heavy-duty work. According to the manufacturer, the table is ideal for milling, drilling or any operation where vibration cannot be tolerated and where accurate, firm locking at a desired index station is required. The base and top plates of the table are both Meehanite castings with hardened surfaces for ball races. The table runs on a hardened steel thrust ring, and a pilot is provided for locating fixtures on the table. Both the shot pin and the locking device are actuated by means of a single operating handle. An equalizing cam action is said to assure both concentricity and parallelism at all times.

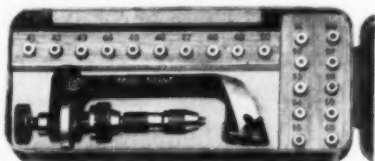


Sesco Positive-Locking Index Table

August, 1955

TRUE POINT DRILL SHARPENER

FOR NUMBER DRILLS 41 to 60
AND 61 TO 80 RIGHT AND LEFT HAND



To save drills, is only peanuts to Dollars lost in spoiled work.
Indispensable for accurate tool work,
fast and handy to operate.

Ask for Circular.

UP-TO-DATE TOOL CO., M-4

P. O. Box, Station A
Worcester 8, Mass., U.S.A.

For more data circle 450 on Reader Service Card

GRANT RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 5, Conn.

For more data circle 451 on Reader Service Card

MULTIPLE DRILLING with a...



MULTI-DRILL

**Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
... FITS ANY DRILL PRESS**

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as $\frac{1}{8}$ "—handle drill sizes up to $\frac{3}{4}$ " in steel. Special adaptations available.

See us at Booth #502 Metalworking
Machinery & Equipment Exposition,
Chicago Coliseum, Sept. 6-17.

COMMANDER MFG. CO.
4224 WEST KINZIE ST. CHICAGO 24, ILL.

Product of Commander — Builder of Production Tools

For more data circle 452 on Reader Service Card

new shop equipment . . .

The top plate rotates freely and easily. A wheel and worm gear, operated through a handwheel, provide easy movement to the top plate. It provides a semi-power assist and can be operated either manually or by power. The standard table is available in sizes ranging from 18 to 48 inches in diame-

ter, with either single or double shot pin. Special table to suit individual requirements can also be supplied.

For more data circle 105 on Reader Service Card

★ ★ ★

VERTICAL LATHE TOOLS FOR FAST CUT-OFF AND FORM WORK

Vertical lathe tools which are designed for fast production cut-off and

form work have been announced by Wesco Machine Corp., Lathe Tool Division, 7536 San Fernando Rd., Sun Valley, Calif. The vertical lathe tools are available in two models for rapid production work where speed and precision are equally important. The vertical cut-off tool features an automatic-return type slide which accommodates a standard cut-off blade. The vertical form tool also incorporates an automatic return type of slide which holds a standard 1/2-inch tool bit.

Both types of tools mount on the headstock of a lathe for maximum rigidity. The tools, it is claimed, can be easily installed and can be quickly set

Star Performers

COAST-TO-COAST

Time SAVING!
Wheel SAVING!
Tool SAVING!

STANDARD CARBIDE TOOL GRINDERS

STANDARD builds a carbide tool grinder for every job "in the book" . . . grinders time-tested by industry for 4 decades! Ask for Literature

the
STANDARD
electrical tool co.

GRINDERS and MACHINE TOOLS
2487 RIVER ROAD
CINCINNATI 4 • OHIO



Type 14 TD Wet or Dry
Twin Wheel Carbide
Tool Grinder
6"-10" & 14" Wheels

Type 10 T Wet or Dry
Single Wheel
Tool Grinder
6"-10" & 14" Wheels

Type 67
Vari-Tool
Finisher
6" Wheel
With
Abrasive
Belt

TWIN WHEEL TOOL GRINDER

NEW WAY
One step from rough to finish grind. Conserve floor space—place grinder against the wall.

STAR PERFORMERS

HALLMARK OF THE WORLD

For more data circle 453 on Reader Service Card

BOSTON UNIVERSAL ANGLE PLATE

A Precision Tool
that Holds Work
at Any Desired
Angle.



Horizontal motion is 360 degrees; vertical motion, 120 degrees. Fitted with vernier scale reading to 5 minutes.

Puts Speed and Profit into Angular Drilling, Milling, Planing, Shaping, Grinding

With a Boston Universal Angle Plate on the job, work is quickly set up on the table and but a few seconds are required to locate it at the desired angle. Indispensable in tool rooms and extremely useful in production runs, the Boston Universal pays for itself many times over by eliminating the necessity of expensive jigs and fixtures.

Made in several stock sizes. Write today for full information.

US AUTOMATIC BOX MACHINERY CO., Inc.

10 ARBORETUM RD.
BOSTON 31, MASS.

For more data circle 454 on Reader Service Card



DYKEM STEEL BLUE

Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.

For more data circle 455 on Reader Service Card

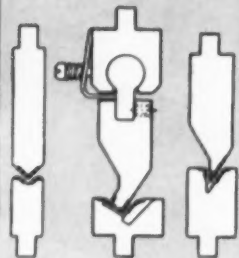
CHICAGO INDUCTION HARDENED PRESS BRAKE DIES

for greater die life at no extra cost on any make of press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.

4915

Steel Bending Brakes for over 50 Years



Heavy lines
indicate
hardened surfaces

DREIS & KRUMP
MANUFACTURING COMPANY

CHICAGO
STEEL BENDING BRACKS
BOX AND PAN BRACKS
PRESS BRACKS

7418 S. Loomis Boulevard, Chicago 36, Illinois

For more data circle 456 on Reader Service Card

new shop equipment . . .

up for operation. The positioning of the cut-off blade is said to assure close working to collet for rigid, fast cutting. According to the manufacturer, an important advantage of the tools is the third position they provide for turret lathes, often eliminating the second

**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**

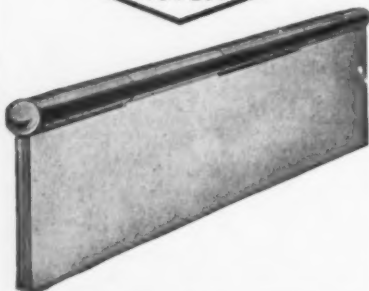
Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



Write for Circular
**NIELSEN TOOL &
DIE COMPANY**
P. O. Box 1067
Berkley, Mich.

For more data circle 457 on Reader Service Card

AUTOM



CONTINUOUS HINGES

Manufactured by
**AUTO MOULDING
& MFG. CO.**

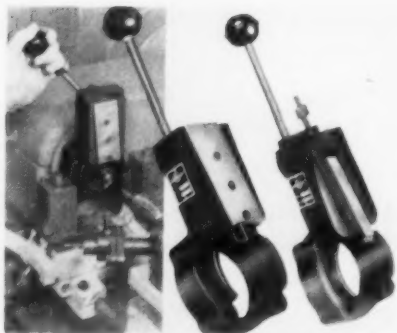
WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 458 on Reader Service Card

224 modern machine shop



(Left) Wesco Vertical Lathe Tool shown in use. (Center) Wesco Vertical Cut-Off Tool. (Right) Wesco Vertical Form Tool

operation. All working parts are of hardened steel, and both tools feature adjustable gib, oil guards and automatic slide return. The tools are designed for use on many lathes, including Elgin, Hardinge, Delta, Atlas, Logan (10, 11 and 12-inch), Warner & Swasey (Nos. 1 and 2), Clausing, Craftsman, South Bend and Sheldon.

For more data circle 106 on Reader Service Card

★ ★ ★

**41-SPINDLE COMBINATION
REAMING, CHAMFERING
AND TAPPING HEAD**

United States Drill Head Co., Dept.
J, 616-618 Burns St., Cincinnati 4,



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 459 on Reader Service Card

August, 1955

SAVAGE

NIBBLING MACHINES

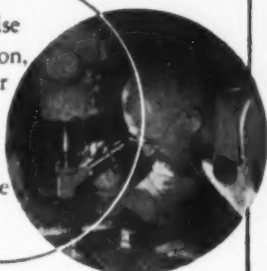
SPECIAL
TOOLS AND DIES FOR
SAVAGE NIBBLING MACHINES
 SAVAGE TYPE "S" Tools and Dies are made from a high carbon, high cobalt, special high speed steel. The life of the tool is increased many times, which means less sharpening, less down time and increased production. **PATENTED SAVAGE** Tool holder permits adjustment of tool for length, which makes possible repeated sharpening of tool.

Quotation on Request
"NIBBLE YOUR COSTS"

W. J. SAVAGE COMPANY
 Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES
 For more data circle 462 on Reader Service Card

Precise
 hole location,
 easy contour
 inspection
 with new
 machine tool
 microscope



- Wide field of view ($\frac{1}{4}$ "); 30x magnification
- Gages accurately to .0001—at a glance
- Mounts on offset bracket, or directly in the spindle
- Fits nearly any machine tool
- Image always appears erect and true
- Ideal for checking slots, contours, surface conditions, or transferring hole locations from template to workpiece.

Write today for complete details.

THE PERKIN-ELMER CORPORATION
 Norwalk, Connecticut



CAN THIS BABY CUT!

Write for
**BIG, NEW
 CATALOG**



No. 38 Throatless BENCH SHEAR

CAPACITY $\frac{3}{16}$ " MILD STEEL

SIZE 9" x 11" x 7 $\frac{1}{2}$ "

LENGTH OF BLADE 5"

WEIGHT 41 LBS.

WHITNEY METAL TOOL CO.
 720 FORBES ST., ROCKFORD, ILL.

Since 1910

For more data circle 462 on Reader Service Card

new shop equipment . . .

Ohio, has developed a special 41-spindle combination reaming, chamfering and lead-screw tapping head. The head consists of a master drive box which operates in horizontal position. It is mounted and keyed on a hydraulic slide, 11-spindle pot head for drilling, 11-spindle pot head for chamfering, 11-

spindle pot head for reaming and 8-spindle individual lead screw pot head for tapping $\frac{1}{2}$ -20 holes in steel forgings. The three pot heads for drilling, chamfering and reaming are driven through the master drive box by a 15-h.p. motor through a flexible coupling. The motor, in this case, is mounted on the hydraulic slide. Two wing brackets, also mounted on the hydraulic slide, are bolted to the rear face of the master drive box.

master drive box.

The head operates in conjunction with a five-station trunnion-type fixture. Brackets bolted and doweled to the front face of each pot head carry the bushing plates used with the three pot heads for drilling, chamfering and reaming. The total height of the head is 49 inches, and the total width is 42 $\frac{1}{2}$ inches. The overall length from the end of the longest spindle to the end of the tapping motor is 55 inches.

Jet-type oil lubrication is furnished for the main box and the three pot heads for drilling, reaming and chamfering. Grease lubrication is furnished for the lead screw tapping pot head. The oil for

WORLD'S HARDEST METAL



BUSHINGS

BLADES

ROLLS

TOOLS

DIES

BAR STOCK

IMPROVED QUALITY

Additional refinements and improvements in our process have added still longer life to the wearing edges of Talide tools, dies and wear resistant parts. The result is a carbide having a new, unique grain structure with harder and tougher properties than previous grades. Laboratory tests reveal our improved grades possess 25% greater strength and rigidity. Service life per grind up to 50% longer than previous grades has been proven in grueling field tests.

METAL CARBIDES CORP.,
YOUNGSTOWN 7, OHIO

Write for Catalog 55-G

METAL CARBIDES CORPORATION

TALIDE

YOUNGSTOWN 7, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

For more data circle 463 on Reader Service Card



6" Universal Dividing Head

with DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

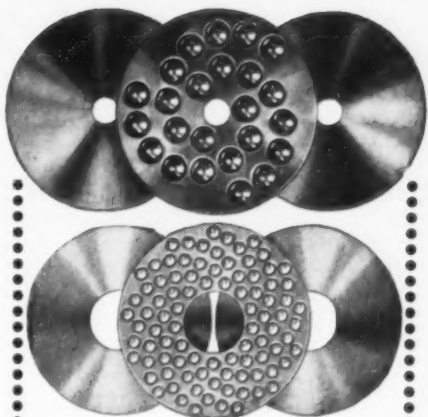
Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave.

Cincinnati, Ohio



BALL THRUST BEARINGS

STANDARD SIZES ARE SHOWN IN OUR GENERAL CATALOG, SENT UPON REQUEST.

Serving Industry for Over 43 Years.

THE GWILLIAM COMPANY
INCORPORATED 1912

358 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 464 on Reader Service Card

For more data circle 465 on Reader Service Card

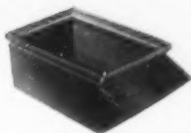
STERLING "TOP RIM" CONSTRUCTION MAKES THE BIG DIFFERENCE

● Our "TOP RIM" construction provides stronger support all around the box—no corner inserts to come loose and fall out. We invite comparison in design, construction and price.

Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

WRITE FOR LITERATURE
AND PRICES.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling Bin Front "Top Rim" Steel Stacking Box. Size 18" x 12" x 6".

Sterling "Top Rim" Steel Stacking Box with drop handles. Size 18" x 12" x 6".



Sterling

Quality Handling & Storage Equipment



For more data circle 466 on Reader Service Card

new shop equipment . . .

the entire lubrication system is supplied by two, 7-quarts-per-minute capacity, vane-type oil pumps. The individual lead screw pot head is totally enclosed with vented-type grease fittings.

In this type of construction, the heat-treated lead screws on the spindles and the bronze lead screw nuts are protected at all times from cool-

ant, grit and grime, maintaining accuracy.

The lead screw portion of the head is furnished with spindles having a safety tap holder. This special holder, it is claimed, positively prevents tap breakage due to bottom tapping, hole to be tapped not being drilled to sufficient depth, or hole not being drilled at all. If any one of these conditions exists, the tap will stop and, upon retraction of the lead screw spindles with

the tap, the spindles will automatically and accurately reset themselves without the assistance of the operator. Special spindle construction is furnished for sealing the oil in, as well as for preventing coolant from entering the pot heads. The lead screw spindles and their spline drivers are protected at all times from jamming at the ends of the forward or reverse strokes due to incorrect setting or failure of the rotary limit switch by means of two safety switches. A 7½-h.p. 900-r.p.m. motor drives the lead screw pot head.

A zero speed plugging switch is utilized instead of a brake. This switch plugs the tapping motor at the end of the re-

Need a really accurate collet chuck?
Before you buy **COMPARE** the new
HANCOCK Ball-Bearing **CHUKOLLET**
with any collet holder.

COMPARE for accuracy!
COMPARE for versatility!
COMPARE for gripping power!
COMPARE set-up time!
COMPARE price!



No collet chuck is as versatile, can grip as tightly or as accurately as the new Chukollet. Can be used on any machine in the shop.

No other collet chuck has an adjustable stop for positive axial location to .0005 inch! 5C collet is not drawn in while closing.

See for yourself. Make a test in your own shop next time you have a job that demands the ultimate in axial and radial accuracy. Remember, Chukollet is guaranteed. Money refunded in 30 days if not completely satisfied! Send for literature today.

Manufacturers'
agents and dealers,
several territories
available.

HANCOCK MFG. CO.

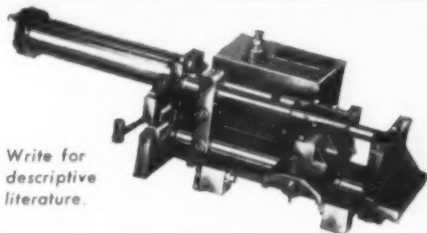
Santa Clara, Calif.

For more data circle 467 on Reader Service Card

COOPER WEYMOUTH
OPEN THROAT
AIR OPERATED SLIDE FEED

For Power Press Operation

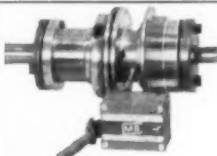
Operates on standard shop air lines.
Easy to set up and adjust, holds to
extreme accuracy. Made in five sizes.
Feeds lengths to 36", up to 18" wide
on mechanical and hydraulic presses.



Write for
descriptive
literature.

COOPER WEYMOUTH, INC., 277 Noble Ave., Bridgeport 8, Conn.

For more data circle 468 on Reader Service Card



Transmission Type

RLH

CONSTANT TORQUE COUPLINGS
with **AUTOMATIC COMPENSATION**
for Friction Variation

WRITE FOR BULLETINS



Spindle
Type

Torque settings unaffected by normal variations in co-efficient of
friction. Breakaway torque and running torque become truly constant.

SPECIAL SHANKS FURNISHED TO ACCOMMODATE INDIVIDUAL APPLICATIONS

BUFFALO MACHINERY CO., Inc. 837 GRANT STREET BUFFALO 13, N. Y.

For more data circle 469 on Reader Service Card

ELECTRICALLY CONTROLLED CLUTCH and TARGET!

with the Improved

SHUSTER
1 AV

**WIRE STRAIGHTENING &
CUTTING MACHINE**



Basic Wire—3/32" to 1/4"
Spring Wire—max. dia. 1/8"

**New Electrically-Controlled Clutch and Target Increases
Efficiency and Production.**

Geared to feed any speed from 50 to 200 feet per minute!

• Immediate selection of appropriate rpm • Suitable for many sizes, alloys, tempers • Simple,
economical operation • Trouble-free maintenance • On-the-job adjustment compensates for
any variation in wire coil. • There is a SHUSTER for every wire straightening and cutting job
from .025" to 11/16" diameter.

METTLER MACHINE TOOL, INC.

157 ADELIN ST., NEW HAVEN, CONN. • N. Y. Office: Eleven Broadway, Whitehall 4-5480

For more data circle 470 on Reader Service Card

new shop equipment . . .

verse stroke. Following the plugging action, the motor speed is quickly reduced to approximately 100 r.p.m., at which point the current is cut out. The decelerating momentum and friction

**STANDARDIZED
MICRO DRILL GUIDES**

All standard body styles available with hole sizes from $\frac{1}{80}$ to $\frac{3}{32}$ ". Tolerances of .0002 maintained on I.D., O.D., and concentricity.

ENGINEERED MICRO-TOOLING, DRILLS,
JIGS, COLLETS, ETC.

MICRO
DRILL
GUIDE




3980
Superior Ave.
Cincinnati 36,
Ohio

For more data circle 471 on Reader Service Card

**Micro
Supreme**

**LAY-OUT AND
IDENTIFICATION DYE**



7 COLORS

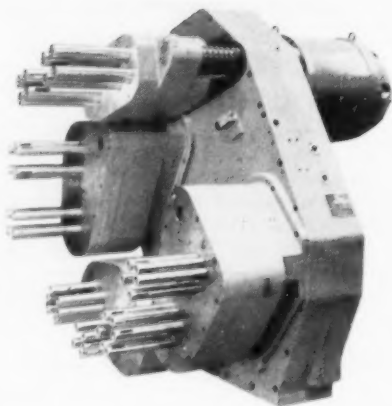
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

**MICHIGAN CHROME &
CHEMICAL COMPANY**

8615 Grinnell Ave. • Detroit 13, Mich.

For more data circle 472 on Reader Service Card

230 modern machine shop



U. S. 41-Spindle Combination Reaming, Chamfering and Lead Screw Tapping Head

in the tapping head brakes the remaining r.p.m. to zero, thus preventing coasting of the tapping spindles.

For more data circle 107 on Reader Service Card

★ ★ ★

**SHAVER FINISHES EXTERNAL
GEARS UP TO 18 INCHES
IN DIAMETER**

Identified as the Model GCU-18-Inch, a Red Ring rotary gear shaving machine which finishes external spur and helical gears up to 18 inches in diameter by either diagonal or conventional shaving processes is available

C A M S

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 473 on Reader Service Card

August, 1955

STEEL
Stanho
PRODUCTS

FLAT BOTTOM
WOODRUFF
KEYS

MACHINE
KEYS

TAPER
PINS

the Quality Line
of Precision Made Steel Products

KEYS—ALL TYPES • COTTER PINS
TAPER PINS • STRAIGHT PINS
MACHINE RACK • SPECIAL PARTS

KOOLHEAD Foundry Chill Nails

WRITE for
DESCRIPTION
and PRICES

STANDARD
HORSE NAIL CORP.
NEW BRIGHTON, PA.

For more data circle 474 on Reader Service Card

THE TWO IN ONE

COMBINATION
ROTARY TABLE
AND
ANGLE PLATE

PRECISION
ACCURACY

WORM adjust-
able from
0 to 90
degrees.

VERNIER
control to
within

WRITE FOR FOLDER 2 seconds of Arc.
Makers of Helical Gear Speed Reducers,
Worm and Gear Speed Reducers. Stand-
ard and Special Gears. Wedge-Lock
Turret for Lathes and Turret Lathes.

Open territory available to representatives

OLSON INDUSTRIAL PRODUCTS, INC.
40 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 475 on Reader Service Card

August, 1955

HOW TO
INSURE TOP
METALWORKING
PERFORMANCE
for only

\$100

Send for a
trial order of

ANTI-SCORING
LUBRICANTS

For top performance on lathe
centers, grinding, press fit,
stamping, die posts and many
other operations—CMD ANTI-
SCORING Lubricant can't be
beat. It makes your operations
smoother, faster, easier, and
of course more profitable. Pre-
vents scoring, seizing, galling...
all bugaboos in modern machin-
ing work. This trial order will
start you on your way to top
performance where a high pres-
sure lubricant is needed. You
will be surprised to find how
long it lasts. Get yours today in
both oil and grease consistencies.

Anti-Scoring
CENTER POINT LUBRICANT
CONTENTS 4 OZ.

TRIAL ORDER—
TWO FOUR OZ. TUBES \$1.00

Send me my order of CMD right away!
Bill me ☐ Bill my company ☐

Name _____

Company Name _____

Address _____

City _____ State _____

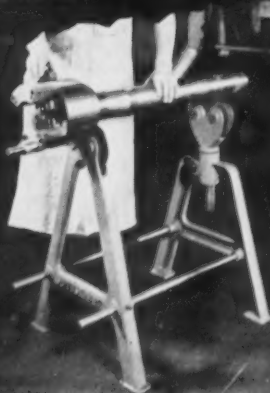
Chicago Manufacturing and Distributing Co.
1910 West 46th St., Chicago 9, Illinois

CHICAGO MANUFACTURING
AND DISTRIBUTING CO.

For more data circle 476 on Reader Service Card

modern machine shop 231

Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES		
Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 556.



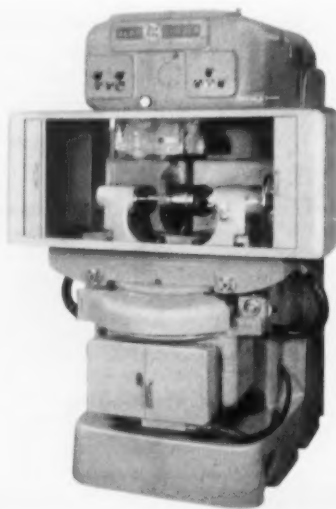
SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

For more data circle 477 on Reader Service Card

new shop equipment . . .

from National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The shaver is available in three different types; namely, a type that shaves gears by the high production diagonal process; a type that shaves by either the diagonal or conventional process and has an automatic differential up-feed mechanism; and a type that shaves by either conventional or diagonal processes, has an automatic differential upfeed mechanism and permits crown shaving operations to be performed. The machine will shave spur and helical gears from 2½ to 18-inch pitch diameter having 4 to 16 diametral pitch teeth. The table has a maximum stroke of 5 inches.

Like other Red Ring rotary gear shavers, the Model GCU-18-Inch has a motor-driven cutter that drives the work gear which is usually mounted on centers. The tailstock on the ma-



Red Ring GCU-18-Inch Gear Shaving Machine

**CUT
TOOL
COSTS**

broken tools
made like new again
with **NU-TANGS**

Twisted or broken taps, repaired at low costs on any tool with a Morse Taper (sizes 1 to 4). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING! NO SLEEVES!
NO SHORTENING! NO DISTORTION!
GUARANTEED STRONG AS NEW!

Send them to us like this! We return them like this!

Patent No. 2,512,011 **NU-TANGS INC.** 1339 Bates Avenue Cincinnati 25, Ohio

For more data circle 478 on Reader Service Card

CAMS

MADE TO YOUR SPECIFICATIONS

— Except Screw Machine Cams —
Design Assistance Offered

KIDDE PRECISION TOOL CORP.
15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 479 on Reader Service Card

RAYMAC *Solid Carbide*
DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

Write for catalog No. 12

RAYMAC

MANUFACTURING COMPANY INC.
3729 CASS AVENUE, DETROIT 1, MICH.

For more data circle 480 on Reader Service Card

**PRECISION
GEARS?**



ROLL TEST THEM RAPIDLY -
ACCURATELY with the

**SCHERR 5" FINE PITCH
GEAR TESTER**

So economically priced they can be placed alongside each Gear Cutter as well as in the Inspection Dept.

Quickly reveals
Runout in Pitch Line,
Spacing Errors,
Errors in Tooth Form,
Running Quality
Generally.

Send for
Illustrated Folder - Code GIKNA

GEORGE SCHERR CO., Inc.

COMPLETE WITH
HIGH CENTER
ATTACHMENT.....

\$425

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

For more data circle 481 on Reader Service Card

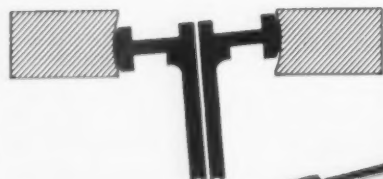
new shop equipment . . .

chine has a handwheel control and a lever-controlled locking mechanism. When equipped for diagonal shaving, the work gear is reciprocated in contact with the cutter at an angle with its axis while a fixed center distance

is maintained between the cutter and work gear. This work cycle has two strokes—forward and return—and provides a high speed shaving operation.

With conventional shaving, the work gear is reciprocated in contact with the cutter along an axis in line with the work gear centerline. The center distance between the work gear and cutter is reduced in accurately controlled in-

Can be adapted to gage **SPHERICAL BORES**



A comparatively simple modification of standard Comtorplug design adapts it for this use.
STATE YOUR PROBLEM.



COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from $\frac{1}{8}$ " to 8" dia.

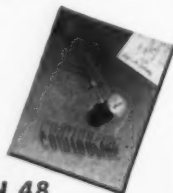
Unique Advantages

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging—automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable—no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, automotive transmission, household appliance, farm machinery, guided missile and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it—investigate and see why.

COMTOR COMPANY

64 Farwell St.
WALTHAM 54,
MASS.



crements at the beginning of each stroke until a depth producing the desired finished tooth size is reached. Then the automatic differential up and down mechanism returns the work gear to proper backlash position for unloading and loading at the end of the cycle. When the machine is made in the universal type, a crowning feature is added in which the work table is rocked to produce ellipsoid teeth slightly thinner at the outer edges than at the middle.

A 3-h.p. motor drives the cutter, and a $\frac{1}{2}$ -h.p. motor powers the table drive. The machine is equipped for coolant, and push-button controls are built into the upper column portion. The electrical control

GET THE FACTS—REQUEST BULLETIN 48

For more data circle 482 on Reader Service Card

WALLS TU-WAY BELT SANDER

Full
1 3/4 h.p.
G. E. Motor



VERTICAL

HORIZONTAL

At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little. **\$89.95** complete with cord, plug, switch ready to use

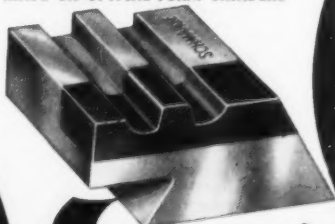
Illustrated Literature on Request

A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 483 on Reader Service Card

**GREATER ACCURACY
FINER FINISH**
MADE ON OPTICAL FORM GRINDERS



Schmarje

FORM TOOLS

3 Styles • FLAT
• DOVETAIL
• CIRCULAR

Send drawings for Prompt Quotations

SCHMARJE TOOL & ENGINEERING CO.

Carbide Reamers • Form Tools

MUSCATINE 3, IOWA

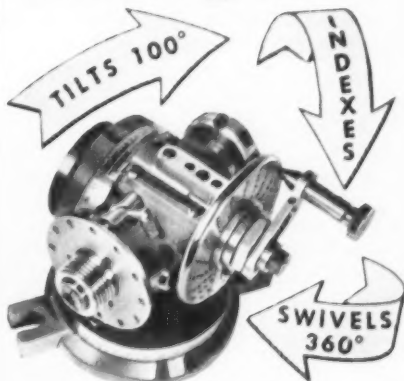
For more data circle 484 on Reader Service Card

August, 1955

FOR FASTER PRODUCTION
the

ELLIS

dividing head



Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6 1/2" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**NICHOLS-MORRIS
CORP.**

76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle 485 on Reader Service Card

modern machine shop 235

new shop equipment . . .

panel is built into the machine casting and is accessible through a hinged door at the side of the machine.

For more data circle 108 on Reader Service Card

★ ★ ★

ADJUSTABLE SOLID STOCK STOP AND ADJUSTABLE SPRING-EJECTOR STOCK STOP

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced an adjustable solid stock stop and an adjustable spring-ejector stock stop for second operation screw machine work. In the design, means have been incorporated for attaching the stock stops to standard collets. Special collets with threaded ends, pins or screws to hold the stop in place are not required. The

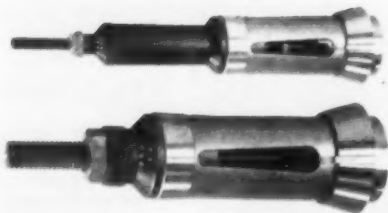


Illustration showing (top) Brown & Sharpe Adjustable Spring-Ejector Stock Stop and (bottom) B&S Adjustable Solid Stock Stop

stock stops are readily interchangeable in regular spring collets for round and hexagonal stock and are available in two styles, spring ejector and solid, eliminating the need for special collets. Insertion in a collet is simple and fast; the operator merely selects the required stop and inserts it in a collet of corresponding size. A partial turn raises a stock pin in the collet slot, and a few



insist on famous
"Jorgensen"

"C" CLAMPS

Also bar clamps, hinged clamps, spring clamps, etc.

ASK YOUR SUPPLIER
Send For Free 32-Page Catalog
ADJUSTABLE CLAMP CO.

"The Clamp Folks"

RUGGED!

436 N. Ashland, Chicago 22, Ill.

For more data circle 486 on Reader Service Card

READING BENCH KEYSEATER

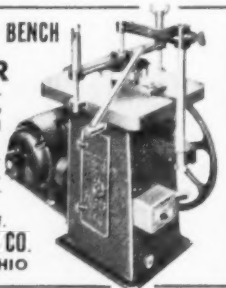
Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



For more data circle 487 on Reader Service Card

So many standard styles . . . one must be just right for you!



For 66 years we have been producing metal-working tools and adding to our standard line. Today we have **PUNCHES** and **DIES** in a large range of round, flat, oval, and square sizes, to fit most makes of punch presses, immediately available from stock at regular low, standard prices.

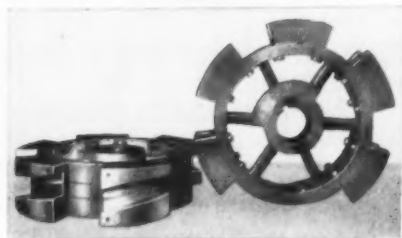
**SEND FOR OUR COMPLETE
CATALOG SHEETS.**

T. H. LEWTHWAITE MACHINE CO.

317 East 47th St., New York 17, N. Y.

For more data circle 488 on Reader Service Card

Rowbottom for Cams



Prompt service at worthwhile savings . . .

A complete service . . . from design through manufacture . . . is offered by Rowbottom in producing cams exactly to your specifications. Any type . . . any size . . . any quantity. Submit specifications.

THE ROWBOTTOM MACHINE CO.
WATERBURY, CONNECTICUT

Also Cam Milling and Cam Grinding Machines.
Details on request.

For more data circle 489 on Reader Service Card

NON-ROTATING DRILL STOP for Precision Hole Depth Control



Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

Write for Free Folder with Illustrations and Prices
EXCLUSIVE DISTRIBUTORS WANTED

WOHLNIP PRODUCTS, INC.

634 Central Avenue

East Orange, N. J.

For more data circle 490 on Reader Service Card

August, 1955

(Advertisement)

New Method Makes Higher Quality Marking Devices

Use of highest quality tool steel and carefully controlled heat treatment in the production of all types of marking devices including steel stamps, inspector's code symbol stamps, embossing dies, marking hammers and roll dies increases life of the devices and reduces overall cost to the user.

The complete line of these steel marking devices is described in Catalog NM-51, available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan. Also described and illustrated are type holders and interchangeable type, automatic roll markers for screw machines, logotypes, etc.

New Method Steel Stamps also maintains complete facilities for production marking, precision engraving and profiling.



Free 12 page illustrated catalog describes complete line of marking devices and facilities for production marking, precision engraving and profiling. Available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan.

For more data circle 491 on Reader Service Card

modern machine shop 237

new shop equipment . . .

additional turns lock the stock securely in place in the collet, ready for use.

In the adjustable spring-ejector stock stop, two adjusting lock nuts on the end of the spring plunger control automatic ejection of workpieces of varying lengths. Both the adjustable solid stock stop and the adjustable

spring-ejector stock stop are available in three sizes for use with Nos. 10, 11 and 22 spring collets.

For more data circle 109 on Reader Service Card

★ ★ ★

SPECIAL MACHINE DRILLS AND REAMS DOOR HINGES

Michigan Drill Head Co., P.O. Box 4643, Detroit 34, Mich., has announced

a double-end, way-type hydraulic feed, trunnion-type machine which is designed specially for drilling and reaming hinge pin holes in automobile door hinges. Feed unit ways are hardened, ground and automatically lubricated. Coolant is provided to all spindles. All electrical and hydraulic installations are built to J.I.C. standards. All drill and reaming heads are pot type, equipped with ball bearings, and drilling spindles are axial adjusted and equipped with chip breakers.

It is a four-place, four-station machine with power-operated trunnion-type fixtures. The part locating and clamping blocks are interchangeable to handle any

TORIT DUST COLLECTORS



...Really draw!

A size and model to solve any dust collecting problem. Torit collectors provide complete, all-around dust control. Torit collectors are unitized for custom installation on each machine, giving power and suction only when machine is operating. Keeps plant and machines free from clogging and unsightly dust. Furthermore, cleaned and filtered air is exhausted back into the room maintaining heat balance. Find out now how Torit unitized dust control is engineered to your problems.

See our catalog in Sweet's Machine Tool File, or write:

TORIT MANUFACTURING CO.

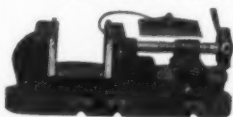
296 Walnut St., St. Paul 2, Minn.

For more data circle 492 on Reader Service Card

"This Seems Worth Looking Into"

GEM VISES

"Standard of Efficiency"



Complete range of sizes for all Machines. Plain, Swivel & Tilting.

Write for complete information.

J. E. MARTIN MACHINE CO.

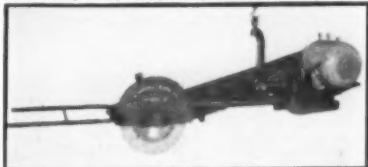
PRR AND STATE

SPRINGFIELD, OHIO

For more data circle 493 on Reader Service Card

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. Hanover, Pa.

For more data circle 494 on Reader Service Card



IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per-hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool!

HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 495 on Reader Service Card

**Greater
Precision!
Increased
Production!**

KUTMORE ADJUSTABLE HOLLOW MILLS

Any combination of . . . turning . . . tapering . . . facing . . . chamfering . . . trepanning in one pass. Exclusive micrometer adjustment feature for rapid set-up. Cutting capacities from 1/32" to 2" diameter in standard stock.

WRITE FOR CATALOGUE No. 20MM

Our engineering department is at your disposal on your hollow mill problems.

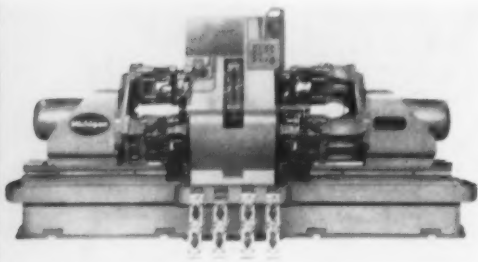
CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO.
ROCHESTER 5, N. Y.



For more data circle 496 on Reader Service Card

new shop equipment . . .



Michigan Special Hinge Driller and Reamer

size hinge. The fixtures are also arranged so that finished parts are automatically ejected after the machining cycle prior to reloading. Fixtures can be provided for various sizes and kinds of hinges. According to the manufacturer, very little effort is required to

change over to other fixtures, for either male or female parts or various hinges. The special machine is claimed to handle 1,800 hinges per hour.

For more data circle 110 on Reader Service Card

★ ★ ★

PRODUCTION-TYPE HIGH SPEED STEEL BROACHES

The duMont Corp., Greenfield, Mass., has announced the inclusion of production-type high speed steel broaches as standard items in the "Minute Man" line of keyway broaches. The production-type broaches are available for $\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ -inch keyway widths and for body diameters from $\frac{1}{2}$ to 1 inch by $\frac{1}{16}$ -inch size increases. The broaches may be used with a hydraulic or hand-operated arbor press. The back of the broach is ground to fit the radius of the

Sharpens Taps, Saws

- Also reamers, milling cutters, Woodruff key cutters
- grinds straight flutes
- sharpens saws in gangs

This versatile grinder takes reamers as small as $\frac{1}{16}$ " dia. . . sharpens saws from $\frac{1}{2}$ " to 8" dia., in gangs up to $3\frac{3}{4}$ " long. It indexes automatically—no special skill needed. *It pays for itself many times over!*

Write for information on 50F Automatic Universal Flute Grinder.

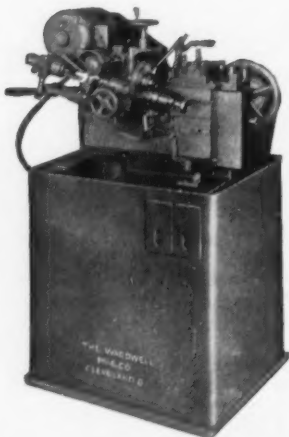


WARDWELL

Manufacturing Co.

3803 Ridge Rd., Cleveland 9, Ohio

Maker of largest line of saw filing machines

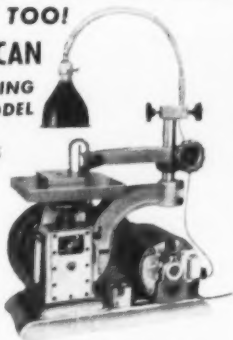


For more data circle 497 on Reader Service Card

SPEED UP DIE MAKING ACCURACY TOO! ALL AMERICAN

**PRECISION FILING
MACHINE, MODEL
875. FILES,
SAWS, HONES**

Patented universal joint file clamp plus file setting square assure accuracy. 380 strokes per min. $\frac{7}{8}$ " stroke. Table readily tilted. Tools quickly changed.



Complete, without lamp or tools.
F.O.B. our plant

\$150.

Send for literature.

Manufacturers of
All American Vibration Fatigue Test Machines



**ALL AMERICAN
Tool & Manufacturing Co.**

8043 LAWDALE AVE., SKOKIE, ILL.

For more data circle 498 on Reader Service Card

New **KNURLMASTER** HAND KNURLER



**NO DISTORTION EVEN ON $\frac{1}{8}$ " STOCK.
MODEL "C"**

Features:

- Uses standard $\frac{1}{2}$ " dia. knurls
- $\frac{1}{8}$ "-1" capacity
- Forged steel frame
- Exclusive screw design gives uniform pressure
- Supplied with set of 3 hardened knurls

Write for illustrated circular
Dealers inquiries invited.

ROCKWIN MANUFACTURING CO.

45 Rose Street

New York 38, N. Y.

For more data circle 499 on Reader Service Card

August, 1955

HIGHER SPEEDS! FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰

IN U.S.A.



Weight 12 ounces;
length 6 $\frac{3}{4}$ inches;
chuck size $\frac{1}{4}$ inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U. S. A.

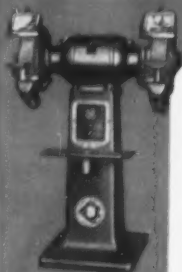
For more data circle 500 on Reader Service Card

modern machine shop 241

**Save
up to
30%**



**Heavy Duty
Bench Grinder**



**Heavy Duty
Floor Grinder**

**cost
less
to own
and
operate**

Queen City

grinders and buffers

So good they're guaranteed: "try one for 30 days . . . if you're not satisfied, return it." It makes cents . . . and dollars . . . to buy equipment like that at prices 20 to 30% under competing makes!

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . is described in newly-revised literature.

WRITE FOR FREE CATALOG TODAY!

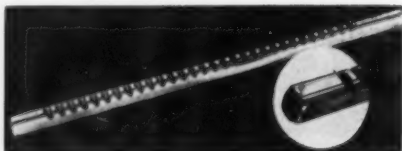
QUEEN CITY MACHINE TOOL CO.

3911 Kellogg Avenue, Cincinnati 26, Ohio
"High Quality—Low Cost—For over 50 Years"

For more data circle 501 on Reader Service Card

242 modern machine shop

new shop equipment . . .



duMont Production-Type High Speed Broach

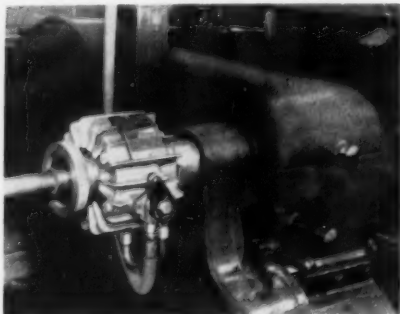
bore in which it will cut, and the body of the broach thereby supports itself in the hole, requiring no guide.

For more data circle 111 on Reader Service Card

★ ★ ★

AIR COLLET CLOSER UTILIZES INFLATED INNERTUBE

An improved air-controlled collet closer which is designed for opening and closing collets on engine and turret lathes of 1-inch bar stock capacity has been announced by Wilson Air Collet Closer, Inc., 909 40th Ave., N.E., Minneapolis 21, Minn. The operating principle of the device is based on a stationary oil-resistant innertube which is inflated by air to operate the collet-closing mechanism, thus eliminating the need for rings, pistons and pack-



Wilson Air Collet Closer installed on lathe

August, 1955

TWO MIGHTY MITES

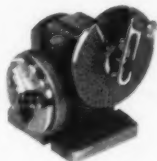


The ROTARY TABLE,
CS-67,

has a 5" working surface and a 1 1/2" overall height.

DIVIDING HEAD,
CS-65,

is a standard 40:1 ratio crank indexing. Overall dimensions with 2 1/2-inch 3-jaw chuck — 4" x 4 13/16" x 4 5/8".



Folder upon request.

Custom

SCIENTIFIC INSTRUMENTS, INC.

541 DEVON STREET

KEARNY, N. J.

For more data circle 502 on Reader Service Card

KEY SPECIALISTS

30 years of customer satisfaction based on a superior product, reasonable pricing, delivery dependability, and company reliability.

Always able to satisfy another customer.



WOODRUFF
FEATHER
GIB HEAD
TAPERED
SPECIAL

Dept. 8

Write for literature

STANDARD AUTOMOTIVE PARTS CO.

664 NIMS ST., MUSKEGON, MICHIGAN

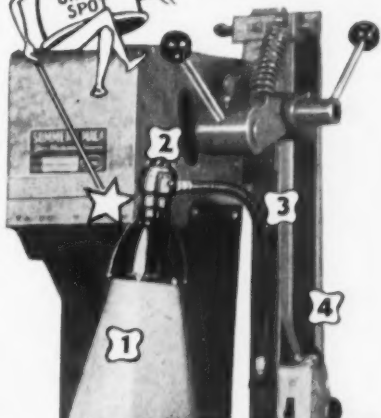
For more data circle 503 on Reader Service Card

August, 1955

VIMCO Lights



for long lighting life
on key working areas



ON THE SPOT VIMCO FEATURES

- 1 Non-glare—eye easing light
- 2 Vimco-tight swivel socket
- 3 Sturdy, adjustable arm
- 4 Simplified Vimco installation

Six standard models for every need
(special design service for OEM)

Photo courtesy Sommer & Maco
Glass Machinery Co.

VIMCOLIGHTS ARE  LISTED

VIMCO MFG. CO., Inc.

Since 1917

111 Breyton

N. Y.

For more data circle 504 on Reader Service Card

modern machine shop 243

new shop equipment . . .

ings. Finger-tip or foot control of the collet closer is provided, which minimizes operator fatigue. Accuracy, elimination of work slippage and damage to delicate parts, and automatic adjustment for variations in size of stock or machined parts are claimed to be other advantages of the collet closer.



the POWER QUILL outperforms, outlasts the outmoded lathe grinder!

The Precise Power Quill is a new tool that combines all the functions of cumbersome, expensive, old fashioned lathe grinders in one small, light, powerful, high precision package. It can be mounted on any standard machine tool to mill, grind, or finish to tolerances of .0001", operates at speeds up to 45,000 RPM, develops up to 1/2 H.P., and can be used on any material with abrasive wheels or tungsten carbide tools. With Precise Power Quills, you cannot only do the work of machine tools costing 100 times as much, but also improve quality, save time, increase tool life, and develop entirely new production methods that really save money!

Attach this ad to your letterhead for a free demonstration or literature!

MMS-8

PRECISE PRODUCTS CORPORATION

1345 CLARK STREET, RACINE, WISCONSIN

Quality and precision since 1882.



SUPER 60

Heat is rapidly dissipated through fins to prevent overheating. All load is carried by two thrust and radial bearings. For more data circle 112 on Reader Service Card

★ ★ ★

HYDRAULIC TABLE HAS 30,000-POUND CAPACITY

To assist in changing large dies, a 30,000-pound capacity hydraulic table

has been designed by The Raymond Corp., 88-133 Madison St., Greene, N. Y. The table has a platform measuring 65 inches wide x 96 inches long, and special heavy-duty rollers are set in three banks so that dies can be drawn from the long side. A 16-inch range of elevation allows the table to be used with presses having bed heights from 29 1/4 to 45 1/4 inches. In operation, the table is raised by a push-button controlled, electric powered, hydraulic pumping unit and six synchronized hydraulic rams. After the top is adjusted to the proper bed height, the table is bolted to the press by means of special plates welded to the long side for this purpose.

Precise

For more data circle 505 on Reader Service Card

**NEW NESTING TYPE
TOTE PANS**



Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 3, Conn.

For more data circle 506 on Reader Service Card

CAM MILLING JIG BORING




A SPECIALIZED CAM
MILLING SERVICE.
JIG BORING
... SPOT WELDING
... CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 52-CN

EISLER ENGINEERING CO., INC.
734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 507 on Reader Service Card

INSTANT ACTION RAPIDSET
by **HARTMANN**



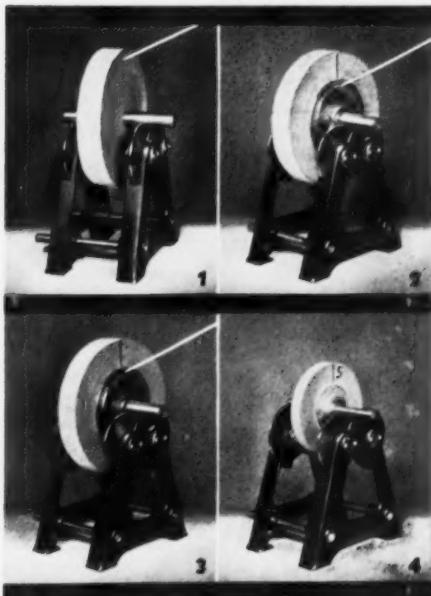
All Purpose Tool Room And
Machine Shop Vises.

**The
JAWSET**

Adjustable Pressure Production Vise.
For Information Write Dept. M.

Hartmann Mfg. Co., 1637 Goult St., Racine, Wis.

For more data circle 508 on Reader Service Card



**QUICK, EASY WAY
TO BRING GRINDING,
BUFFING, AND POLISHING
WHEELS INTO BALANCE...**

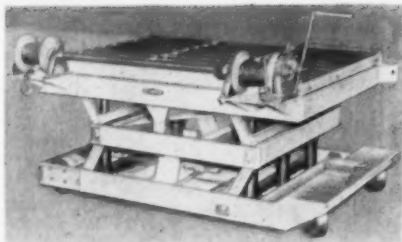
(1) Balance on Anderson super-sensitive Balancing Way and mark light side. (2) Line up mark with both zeros on Anderson Speedi-Balancer. (3) Turn both discs till wheel balances. (4) Record setting. Wheel is now prebalanced for instant use when needed: just use Speedi Balancer, set to number marked, as outside collar. Save time. Eliminate weights. Reduce vibration. Increase motor bearing life. Improve motor performance. For information on sizes, types, and prices of Anderson Balancing Ways and Speedi-Balancers, write for Bulletin 6-22.

ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

For more data circle 509 on Reader Service Card

new shop equipment . . .

Cables are fastened to the die at two ends, and a 96 to 1 ratio double drum winch makes it possible for one man to pull the heaviest dies from a large press. The unit is portable and can be positioned by two or three men. For movement under load, a hitch is provided for an industrial tractor. The unit



Raymond 30,000-Lb. Capacity Hydraulic Table



The coolant stinks, eh?

Well, don't dump it!

We'll kill that odor with the new powder-additive: *Rance-RID*

IT'S A SERIOUS COST-PROBLEM:

Metalworking plants are pouring coolant and labor dollars down the drain. The reason: coolant turns rancid.

RANCE-RID SOLVES THE PROBLEM:

It restores the original condition of the oil emulsion. It smells, looks, and is like new. No masking odors are used . . . Use it in central-type coolant systems, or in individual machines. Treat the same coolant over and over again!

TRY RANCE-RID—AT OUR EXPENSE:

That sounds generous. Actually, it isn't. Rance-Rid sales have been built on one-ounce samples. Just one ounce treats 20 gallons of soluble oil emulsion . . . Try it—at no cost. Your inquiry brings the sample.

HERSEN CHEMICAL CO.

825-E FISHER BLDG., DETROIT 2, MICH.

For more data circle 510 on Reader Service Card



Your Inquiry brings this FREE SAMPLE

can also be equipped with sling holders for movement by an overhead crane.

For more data circle 113 on Reader Service Card

★ ★ ★

AUTOMATIC GAGE FOR BALL BEARINGS

Designated as the Model 143 B-18, a completely automatic, hopper-fed electronic gage which measures the o.d. of precision ball bearings, $\frac{1}{4}$ to $\frac{17}{32}$ inch, and sorts them into 12 good classifications of 0.00001 inch each plus oversize and undersize has been announced by Federal Products Corp., 5146 Eddy St., Providence 1, R. I. The operating speed of the gage is adjustable to sort bearings up to 24,000 per

hour. According to the manufacturer, the gage will not mark the highly polished surface of the balls, and a unique lifting mechanism retracts the gaging contact before and after measurement.

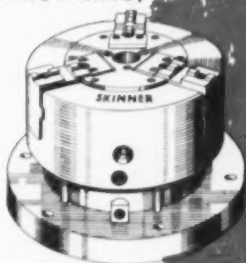
The gage is completely automatic. The operator fills the hopper and presses the start button. The gage then measures and sorts balls according to diameter. From the rotary type hopper the balls drop into one of the eight holes in the rotating index wheel. As the ball is carried beneath the sensitive contact, the contact is retracted. At the proper time sequence, determined by timing microswitches, the sensitive contact is lowered to the ball o.d. and the size is found by the electronic gage head and amplifier. This signal, in the form of an electronic impulse, is transmitted to the correct o.d. size station in the classifier.

The gage sensitive contact retracts and the index wheel transfers the ball to the large wheel which carries it



Federal Model 143 B-18 Ball Bearing Gage

NEW SKINNER POWER CHUCK FIXTURE (NON-ROTATING)



**POWERFUL! ACCURATE!
FAST! DURABLE!**

Close coupling makes this Skinner Power Chuck Fixture the lowest, most compact unit of its type! Air-operated, it can be used on drilling, milling and transfer machines, and for assembly operations.

Special wedge action provides tremendous gripping power. Self-centering, self-locking. Available in 8", 10" or 12" dia., with 2 or 3 jaws. Operable with either a Skinner hand valve or a 4-way solenoid or foot valve. $\frac{3}{8}$ " pipe connections. Max. air pressure: 100 lbs.

Write for Bulletin PCF 67

THE CREST



OF QUALITY

THE SKINNER CHUCK COMPANY

210 Edgewood Avenue, New Britain, Conn.

For more data circle 511 on Reader Service Card

modern machine shop 247

new shop equipment . . .

around to the correct size disposal chute. When the ball is at the correct chute, the trap door beneath it is opened by action of the mechanical "memory," and the ball drops into an oil-filled tote box beneath the gage front. The gage can be modified to sort precision roller bearings for diameter and/

or length, as well as for dowel pins, cylindrical bearings, precision mandrels and similar products.

For more data circle 114 on Reader Service Card

★ ★ ★

AIR PRESS HAS DEEP BASE

Identified as the CP-12-S, an air press with a deep base, designed for delicate production jobs where speed is essential, has been announced by Mead Specialties Co., Dept. CP-42, 4114 N. Knox Ave., Chicago 41, Ill. To meet the requirement for less "give" in an arbor press of this type, the solid column has been mounted in a base which is said to provide maximum rigidity. The air press, it is claimed, is adjustable both vertically and



We call them TAP-LOK INSERTS* They are hard threaded bushings used chiefly as original equipment in all types of materials. They are also used to reclaim parts with stripped or damaged threads.

In a *single* operation, TAP-LOK INSERTS tap their own threads and provide a firm anchorage for threaded fasteners. No pre-tapping or secondary operations necessary. And they can be installed by unskilled labor

Available in either steel or brass, TAP-LOK INSERTS are made in a variety of standard thread sizes.



Send for descriptive folder.

Also manufacturers of
Groov-Pins for positive locking press fit.



GROOV-PIN CORPORATION

*Reg. U.S. Pat. Off.

1135 Hendricks Causeway • Ridgefield, New Jersey

For more data circle 512 on Reader Service Card



Mead Model No. CP-12-S Air-Type Press

radially, and the length of stroke can be regulated exactly by means of the lock nuts and collars on the upper ram. Tall columns are available for applications requiring more clearance under the ram.

For more data circle 115 on Reader Service Card

★ ★ ★

AIR-HYDRAULIC TABLE FEED FOR BURKE BENCH MILLERS

For controlled, high speed production of small parts, an air-operated hydraulically-controlled table feed has been developed for the four models of Burke bench millers by The U. S. Burke Machine Tool Division, 3 Brotherton Rd., Cincinnati 27, Ohio. Burke millers can be equipped with either 16 or 20-inch long tables, and on either table an 8-inch stroke air motor can be used, together with an 8-inch stroke



Burke Air-Hydraulic Table Feed

hydro-check valve and suitable limit switches, transformers and solenoid valves. The air-hydraulic fed table is adaptable to an extremely wide range of applications, including milling, sawing, facing, slotting and many other similar operations.

Unusual speed, accuracy and econ-

PDC

AUTOMATIC INDEXING ASSEMBLY PRESS



CAPACITIES
TO 6 TONS

14 3/4" DIAMETER
DIAL PLATE

ELECTRIC
MOTOR DRIVE

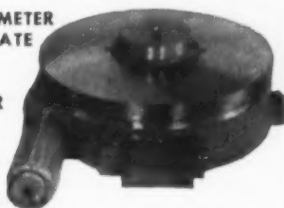
PDC

AUTOMATIC GENEVA MOTION INDEX TABLES

14 3/4" DIAMETER
DIAL PLATE

ROTARY
AIR MOTOR
DRIVE

COMPLETE
WITH ALL
CONTROLS



PRECISION DETROIT CO. 20105 SHERWOOD DETROIT 34, MICH.

CALL YOUR AREA REPRESENTATIVE:

CHICAGO.....	ORchard 5-6929
CLEVELAND.....	BOulevard 2-4740
CINCINNATI.....	AYon 1-1136
INDIANAPOLIS.....	MElrose 4-4473
LOS ANGELES.....	VIctoria 9-1803

DETROIT (Home Office & Plant,) TWInbrook 2-5331

Territories Available for Representation

NEW HAVEN, CONN.....	SPruce 6-4932
NEW YORK CITY.....	Murray Hill 3-6135
PHILADELPHIA.....	MIchigan 4-0807
SAN FRANCISCO.....	OLympic 3-3161
ST. LOUIS.....	JEfferson 5-1223

For more data circle 513 on Reader Service Card

new shop equipment . . .

omy of operation are claimed for the table feed. Distance and speed of the rapid traverse approach, the cutting feed and length and rapid automatic return can be easily varied to suit the particular job requirements. In addition to increased production and lower costs, the manufacturer states that

the air-hydraulic feed results in better machined finish and in significantly increased tool life.

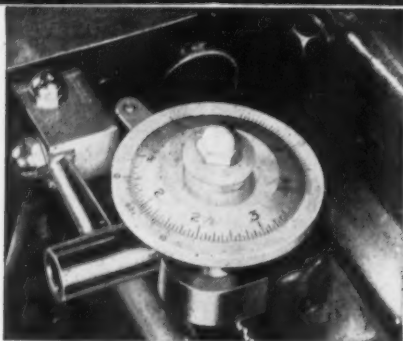
For more data circle 116 on Reader Service Card

★ ★ ★

FORMING MACHINES FEATURE PINCH-TYPE ROLLS

Available in an unusually wide range of power and hand-operated models, a line of slip roll forming machines featuring pinch-type rolls to assure production of commercially-true cylinders virtually free from flat spots has been announced by Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. Two of the rolls feed the material. The third roll, in the rear, deflects the sheet to produce the curvature. The upper feed roll, around which the sheet is formed, swings open at one end, clear of its bearing, to permit completed cylinders to be removed quickly and easily. Working with lengths up to 120 inches and thicknesses up to 1/4-inch mild steel, the formers are used in diverse

YESTERDAY'S PIONEER . . . TODAY'S LEADER



WELDON . . . MEASURING ATTACHMENT

(Direct Reading) **Saves Time • Reduces Waste**

● This handy Weldon attachment measures directly the forward or reverse movement of the lathe carriage, within .001 of an inch. Easily attached to most lathes by drilling and tapping of one hole. ● Dependable, accurate, convenient — saves time and reduces work spoilage.

WRITE FOR CIRCULAR LA-1

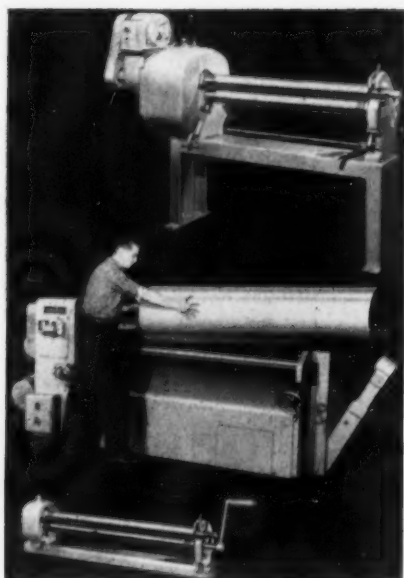
*Weldon distributors throughout U. S. A. and
Canada carry complete stocks to serve you.*

THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 514 on Reader Service Card



Niagara Slip Roll Forming Machines

applications to form light and heavy pipe stacks, drum, pail, tub and other container bodies; large tank segments; multiple beads; and numerous kinds of cylindrical, oval, rectangular and obround products.

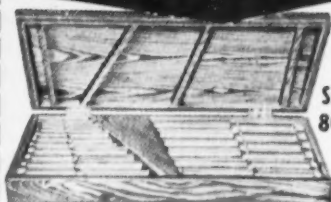
Standard units are built in heavy, medium and light capacities with 6, 4, 3, 2, 1½ and 1-inch rolls to handle general requirements.

For more data circle 117 on Reader Service Card

THREE-LINE STAMP HOLDER

M. E. Cunningham Co., 1051 Chateau St., Pittsburgh 33, Pa., has announced the Luminum-Line Model LP-3S Three Line Holder which includes a combination of single characters and multiple character steel stamps for marking name identification, heat number, serial number, ten-

MANHATTAN'S MIRACLES! GOVERNMENT SURPLUS



SAVE
80%

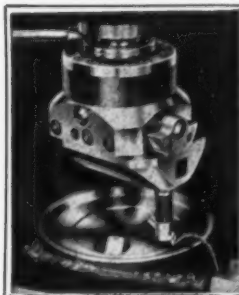
SET OF CARBON STEEL **ALL NEW**
HAND REAMERS
STRAIGHT FLUTE In Wooden Case
SIZES 1/4" to 1-1/4" IN 32NDS

Tremendous savings on
all new cutting tools.
Send us your inquiries
and write for circular
listing sensational bar-
gains!

Regular price \$180.
OUR low price
only \$35.00
Limited quantity!

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N. Y.
Telephone: CAnal 6 4992

For more data circle 515 on Reader Service Card



REASONS WHY MODERN ENGINEERS SELECT The Wohlhaupter **MASTERHEAD**

For Precision Work & Most Economical & Automatic Operation

- The MASTERHEAD does Boring, Facing, Recessing, Undercutting, Outside Turning, etc.
- It does this in One Operation and on One Machine.
- Automatic Feeds
- Automatic End Release.
- Increases the capacity of your present equipment.
- Increases Production, makes Better Finished Work.
- Nine Models available for work up to 36¼" diameter.

Also taper cutting heads.

Sole Agent

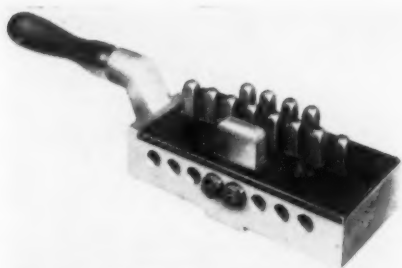
Send for illustrated literature.

KARL A. NEISE, 404 Fourth Ave., Dept. MMS, New York 16, N. Y.

For more data circle 516 on Reader Service Card

new shop equipment . . .

sile, and so on, on plates. Individual spring plungers retain the stamps in the holder, but spring tension is controlled so that the operator can quickly pull a stamp out and insert a new one for any changes required. The design includes replaceable feet to keep the holder level on the plate being marked. The holder is cast in one piece from



Mecco Luminum-Line No. LP-35 Stamp Holder



Cutting Keyways the HARD Way?

You can cut your own keyways by hand, with an arbor press, in *one minute* for as little as *one cent*. Do it the *easy* way with a du MONT Minute Man Keyway Broach Kit. For keyways from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3".

SAVE ON BROACHING SQUARE HOLES

Minute Man High Speed Steel Square Broaches finish cast or drilled holes much more accurately and far cheaper than by hand. For $\frac{1}{16}$ " to $\frac{3}{4}$ " squares.



The du MONT CORPORATION, Greenfield, Mass.

MAIL FREE BROACH CATALOG AND PRICE LIST S describing 25 standard kits, 23 standard broach sizes, 71 bushing sizes, square broaches and a wide range of SPECIAL BROACHES to

Name

Company

Address

For more data circle 517 on Reader Service Card

a tough grade of aluminum and has a special steel top which is permanently attached to give protection from misdirected hammer blows. The aluminum body minimizes the weight of the holder.

For more data circle 118 on Reader Service Card

★ ★ ★

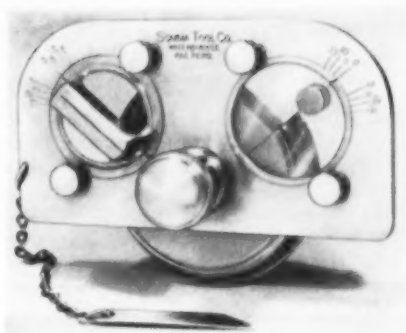
GAGE FOR CHECKING FORM TOOLS

Identified as the "Scribe-Chek," a precision cutting edge gage which is designed for use in the checking and sharpening of circular form tools used on automatic screw machines has been announced by Somma Tool Co., Inc., 20 Brown St., Waterbury, Conn. The

gage permits 'scribing' of the exact cutting edge required on the tool (with or without top rake) and visual checking of the results after sharpening. Conversely, where a particular cutting angle has been established through experimentation, it can be measured and consistently reproduced thereafter. Either way, its operation is so simple that inexperienced men can accurately and quickly sharpen and check form tools.

The gage consists of a plate with center stud which screws into the threaded hole on the circular form tool. Set into the plate are two rotating dials, their centers located at the outside diameter and offset distance of the particular size tool for which the gage is made. One of these dials is for checking.

It has a lens with a hairline which, when lined up with graduations on the plate, indicates either left or right-hand



Somma "Scribe-Chek" Cutting Edge Gage

cut at any rake from 0 through 15 degrees. The other dial is for marking form tools for grinding. It is a slotted ring and its slots line up with graduations on the plate for any rake from 0 to 15 degrees, left or right. It is used in connection with a blade attached to the



SHORT RUN STAMPINGS

May be Your Answer:

- For Designing New Products
- For Changing Existing Products
- For Experimental Work
- For Pilot Runs
- For Meeting Deadlines
- For Supplying Limited Markets
- For Sales or Exhibition Models
- For Obsolete Parts
- For Cutting Costs

FREDDY FEDERAL SAYS:

If you need Low Cost, simple or intricate "Controlled Tolerance" short run stampings in any metallic or non-metallic material that's stampable, come to Federal Tool! We can supply any quantity, 2 pieces to 10,000... any thickness up to 1/4-inch, or within the stamping capacity of 125 tons. We give you tooling investment savings up to 80% over conventional methods.

Use Federal's New, Modern Facilities... Send sketch, print or sample and application. We will send you a quotation promptly.



Free: NEW CATALOG 201 AND SAMPLES ON REQUEST

FEDERAL TOOL and MANUFACTURING CO.

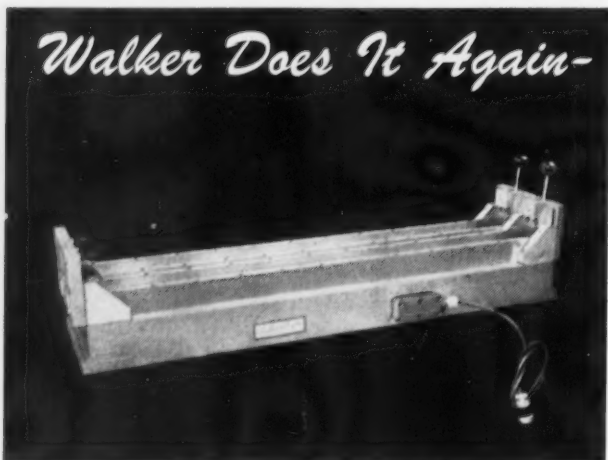
3615 ALABAMA AVE. • MINNEAPOLIS 16, MINN.

For more data circle 518 on Reader Service rCard

new shop equipment . . .

gage. The blade slides in the slots and is used to scribe a line for grinding on the edge of the circular form tool. This scribing dial is cut away on both sides of the center slot for maximum visibility, permitting the operator to see where the edge is being marked.

For more data circle 119 on Reader Service Card



1. Walker designs and builds intricate magnetic fixtures for the automotive and aircraft industries.
2. Accurate and positive holding assured.
3. Consult Walker Engineers for the solution of your holding problems.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

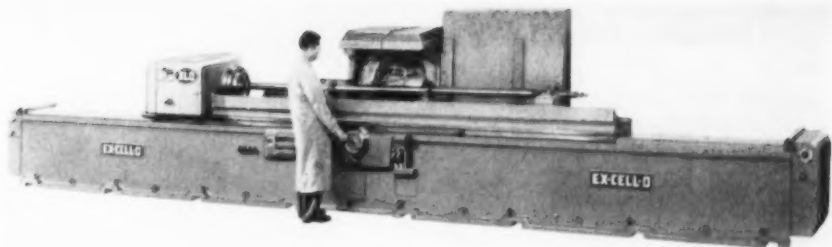
For more data circle 519 on Reader Service Card

**MACHINE GRINDS 10 FEET OF
THREAD LENGTH IN ONE SETTING**

Identified as the Style 120, a precision thread grinder which is designed to grind 10 feet of thread length in one setting, accommodate work up to 12 feet long between centers and hold close tolerances on form, pitch diameter and lead has been announced by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. According to the manufacturer,

workpieces longer than 12 feet can be inserted through the work spindle, and threads longer than 10 feet can be ground a section at a time or by turning the work end for end. The lead at adjacent sections can be picked up and continued accurately.

Automatic features of the Style 120 grinder include feed to finish size, grinding wheel dressing, resumption of the grinding cycle after dressing, backlash compensation, control of coolant flow, lubrication and retracting the grinding wheel at the end of the grinding cycle. One of the features which is said to ensure precision in the long grinder is that the work table is fully



Ex-Cell-O Style 120 Precision Thread Grinder for grinding 10 feet of thread length

supported the full distance of its travel. Anti-friction rollers under the table provide ease of movement, which also contributes to accuracy. The base ways are completely covered and protected at all times by a wide belt which is attached at both ends of the table and which travels on rollers around the ends of the machine and under the base. For more data circle 120 on Reader Service Card

ROTARY INDEX TABLE PROVIDES ACCURACY IN AUTOMATIC FEEDING

Designated as the Model BRET-13, a 13-inch diameter rotary index table designed specifically for use where high accuracy in automatic feeding of work to tools is required has been announced by The Bellows Co., Akron 9, Ohio.




**You're not gambling
IF you have an ACE in the hole!**

ACE DRILL BUSHINGS are always a sure bet!

- Quality • Accuracy
- Largest Deliverable Stocks Anywhere!

Over 22,000 sizes, types and specifications in A.S.A. and ACE standards, micro and super sizes plus bushings for embedment in plastic or castable material.

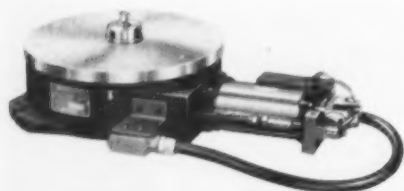



ACE DRILL BUSHING CO., INC.
5407 Fountain Ave., Los Angeles 29, Calif.

Write for Catalog "E"

For more data circle 520 on Reader Service Card

new shop equipment . . .



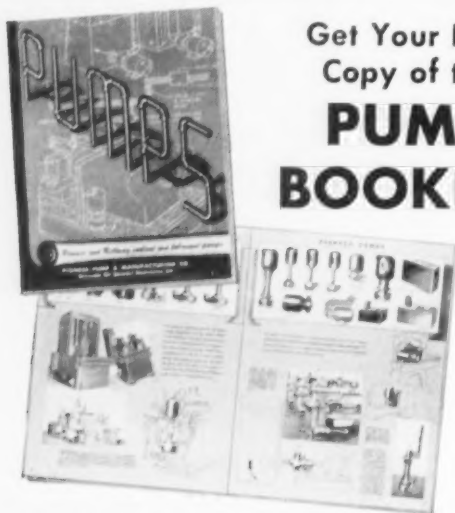
Bellows Model BRET-13 Rotary Index Table

According to the manufacturer, the unit can maintain repeat accuracies as close as 0.0005 inch. The table features a unique cam movement which is said to assure a positively locked table top at all times. The table top is equipped with hardened and ground steel dowel pins which are engaged by hardened tool steel pawls to index the top and lock it in the exact work position. The table top rotates on hand-scraped surfaces of the base housing.

The unit is available in three styles;

namely, one for fixed indexing of 4 stations, one adjustable for indexing either 6 or 12 stations and one adjustment for 6, 9 or 18 stations. Other numbers of stations can be furnished on special order.

For more data circle 121 on Reader Service Card



**Get Your Free
Copy of this
PUMP
BOOKLET**

**It Gives You Basic Information on
PIONEER Centrifugal
and
ROLLWAY Positive Displacement
PUMPS for**

**Coolants, Lubricants,
and Abrasive Liquids**

Booklet illustrates some 40 Pioneer and Rollway models, with many application pictures and a description of the features of basic pump types.

PIONEER PUMP DIVISION
DETROIT HARVESTER COMPANY

5450 West Jefferson Ave.

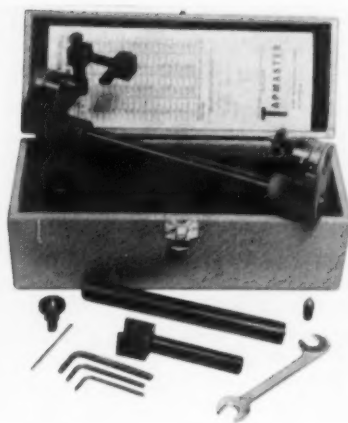
Detroit 9, Michigan

For more data circle 521 on Reader Service Card

★ ★ ★

**TAP RECON-
DITIONING
INSTRUMENT**

Component Parts Co., Box 504, Whittier, Calif., has announced the "Tapmaster," a precision instrument for accurate tap reconditioning. Durable constructed to withstand years of shop use, the instrument is designed to operate in any shop equipped with



"Tapmaster" Tap Reconditioning Unit

a tool and cutter grinder, cylindrical grinder or lathe equipped with a tool post grinder. The unit can be set up quickly and easily for regrinding taps ranging in size from No. 10 to 2½-inch inclusive. According to the manufacturer, it permits controlled radial clearance, maintains concentricity of chamfer with pitch line and has a graduated scale which eliminates the need for fixed cams to control back-off. The Tapmaster, it is claimed, encourages tap sharpening, thus resulting in long tap life, accurate tapping and minimum tap breakage.

For more data circle 122 on Reader Service Card

UNIT PROVIDES RAPID, POSITIVE AND ACCURATE INDEXING

Identified as the "Roto-Indexer," a unit which is designed to provide rapid, positive and accurate indexing in connection with milling, drilling, jig boring, grinding and slotting operations has been announced by Troyke Mfg.

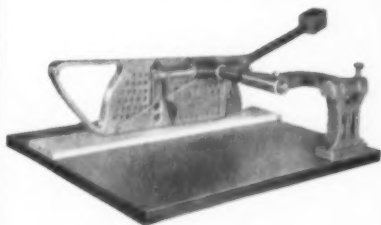
FLOHR AUTOMATIC SAW GUARDS

FOR WOOD-WORKING MACHINES

All Steel and Iron Construction
APPROVED BY U.S. DEPT. OF LABOR

Thousands in use. Will fit all saws.

Types include, Floor, Overhead, Standard, or Spreader Mounted Guards.



Send for circular.

D & M GUARD COMPANY

893 Military Road • Buffalo 17, N. Y.

For more data circle 522 on Reader Service Card

Here's our NEW MODEL "A" A SMALL SAW WITH LARGE CAPACITY

MODEL A—Capacity 6" x 11" with BIG machine features. Rugged construction. Precision saw guides. Adjustable cutting pressure and rate of descent. Quick action swivel vise. ½" blade. Rotary blade brush. Automatic blade shut-off. ⅓ H.P. motor with overload protection. Table available to use saw vertically for contouring, notching, and slotting! Send for FREE CATALOG today.

W. F. WELLS & SONS

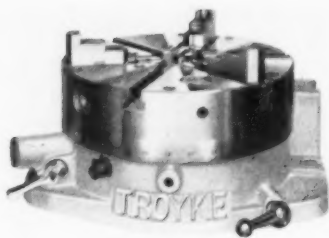
Three Rivers, Mich.

For more data circle 523 on Reader Service Card



new shop equipment . . .

Co., 4422 Appleton St., Cincinnati 9, Ohio. The unit features a unique block-out arrangement, hardened and ground 24-station index plate and hardened and ground plunger. According to the manufacturer, any or all stations can be blocked out with the use of only a screw driver. The rigid locking center



Troyke "Roto-Indexer" Indexing Unit

Precise-Uniform Gillen TAPER

1/4" per foot

- For Precision Assembling
- Available in All Metals
- Complete Range of Sizes
- Rust Resistant Coating
- Standard Turned Pins
- Centerless Ground Pins
- Threaded End Pins
- Immediate Delivery

New Threaded End Pin
Has Many Uses for
Blind Hole Assemblies



John Gillen Company

Every Type of Keying and Pinning Device



2542
S. 50TH AVE.,
CICERO 50,
ILLINOIS

PINS

Diameters
From 7/0
to No. 14

•
Up to
13"
Lengths

•
Write For
TAPER PIN
Price List
and Samples

Taper Pins
•
Groove Pins
•
Machine Keys
•
Woodruff Keys

bearing is adjustable for wear, and two oil-grooved bearing surfaces rigidly support the table. The unit is graduated in degrees and can be used in either a vertical or horizontal position.

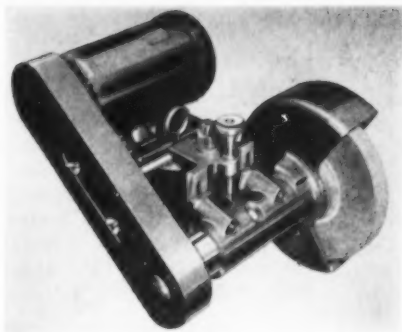
The indexing unit is available in two sizes, 12 and 15 inches, and in four models; namely, the Models AC-12, AX-2, AH-12 and AL-15. The Model AC-12 has a special 12-inch diameter steel body chuck; the Model AX-2 has a 12-inch platen with a 4 1/2-inch diameter pilot; the Model AH-12 has a 12-inch T-slotted turntable; and the Model AL-15 has a 15-inch T-slotted turntable.

For more data circle 123 on Reader Service Card

For more data circle 524 on Reader Service Card

TOOL POST GRINDER FOR HEAVY-DUTY CYLINDRICAL AND SURFACE GRINDING

Designated as the Series 25, a 3-h.p. tool post grinder for heavy-duty cylindrical and surface grinding operations has been announced by Dumore Precision Tools, 1311 17th St., Racine, Wis. Powered by a constant speed induction motor, the grinder is capable of swinging wheels up to 12 inches in diameter x 1½-inch face, at speeds of 1,750 r.p.m. The unit converts any basic machine tool into a precision external grinder and is designed for mounting on lathes 20 inches or larger, planers, shapers, vertical boring mills, and so on. The motor comes furnished with built-in magnetic starter and over-load protector. A rugged cast iron frame provides rigid vibration-free mounting.



Dumore Series 25 Tool Post Grinder

The quill is 3 inches in diameter, is machined from solid bar stock, and is equipped with large, oversize Timken tapered roller bearing, grease-lubricated and preloaded at the factory. At 1,750 r.p.m., the bearings have a radial

BEVERLY

Pneumatic **THROATLESS SHEAR**

FASTER, EASIER CUTTING
to any Shape!

- Compactly built for maximum visibility and efficiency
- Operates on 35 to 150 PSI air pressure
- Adjustable power and return stroke length and speed

Beverly Pneumatic Shears combine all the advantages of Beverly Throatless Shears with fast, effortless cutting action through air cylinder operation. Air operation speeds work, permits accurate cutting to a pattern or template, as operator can concentrate on guiding work through the shear. Flow control valves permit precise adjustment of stroke speed; adjustable actuating arm controls stroke length. Foot Switch permits operator to use both hands on the work piece. Operates on 110V. 60 cycles AC and 35 to 150 PSI air pressure.

See your nearby Beverly Distributor

Write for catalog
sheet and
complete details.



CAPACITY
¾" MILD STEEL
10 GA.
STAINLESS

BEVERLY SHEAR MANUFACTURING CO.
3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle 525 on Reader Service Card

new shop equipment . . .

capacity of 955 pounds and a thrust capacity of 655 pounds. A double V-belt drive transmits power smoothly from the motor to the quill. The center line of the spindle to the center line of the mounting post is 3-37/64 inches. The quill adjusts vertically 1 5/8 inches for quick wheel centering by turning

a handwheel. The grinder is available for 220 or 440-volt, three-phase, 50/60-cycle, a.c. operation.

For more data circle 124 on Reader Service Card

★ ★ ★

PORTABLE POWER SCREW-DRIVERS AND NUT RUNNERS

Identified as "Magnamatic," a series of torque-controlled portable power

screwdrivers and nut runners designed for efficient, high-production-rate applications has been developed by Chicago Pneumatic Tool Co., 8 E. 44th St., New York 17, N. Y. The tools feature a unique type of magnetic "one-shot" clutch which is designed to give precise control of fastener tightness. According to the manufacturer, the Magnamatic screwdriver provides for minimum work spoilage, high production rates and minimum clutch maintenance. An acoustic-type baffle is claimed to lower operating noise. Thirteen Magnamatic models, including both reversible and non-reversible types, are available to handle screw sizes

FINEST SEEING TOOLS EVER DESIGNED

Direct Light
Exactly as you
want it



Also
Available
with
one arm

ONLY

\$8.97
Each

in std.
pkg. of 4

List \$10.55 ea.

MODEL 55-CX-701

NEW Universal Arm Joints—Bend 135°. Large frictional triple disc bearing surface. Smooth, easy movement. Instantly adjustable by hand to direct light exactly as needed.

NEW Collar Disc Joints—Rotate 180°. Combination of 135° bend joints and 180° rotating joints provides amazing articulation for positioning reflector.

NEW Reflector—Bell shape with 6 1/4" orifice. Accommodates 100 watt A-21 lamp. Available with lens.

NEW Base—Universal for horizontal or vertical mounting. Outlet box base optional.

NEW Wiring—Keyless porcelain socket and separate toggle switch. 8 ft. SPT-2 18/2 heavy duty plastic rip cord with molded plug.

NEW Finish—Semi-gloss Vista Green baked enamel. Reflector interior, high temperature White.

WRITE for Complete
Catalog of Localite
models for every
industrial use.



THE FOSTORIA PRESSED STEEL
CORPORATION • Fostoria, Ohio

Localites are available through
wholesalers everywhere.

For more data circle 526 on Reader Service Card





Chicago Pneumatic "Magnamatic" Portable Power Screwdrivers and Nut Runners

from No. 4 up to $\frac{3}{4}$ inch, the sizes most commonly encountered on production lines.

For more data circle 125 on Reader Service Card

★ ★ ★

AEROSOL UTILITY KIT

Crown Industrial Products Co., 1511 Amsterdam St., Woodstock, Ill., has announced the "Spray Line" Utility Kit which consists of four 6-oz. aerosol (spray-type) cans containing Crown Lubricating Oil, Penetrating Oil, Rust Inhibitor and All-Weather Clear-Coat. These aerosol products are claimed to enable the operator to spray any of these materials in and around



Crown "Spray Line" Aerosol Utility Kit

August, 1955

ESSEX
Precision

**CARBIDE &
HIGH SPEED
CUTTING TOOLS**

CARBIDE TOOLS:
Burs
End Mills
Reamers
Burr Sets
Special Tools

**HIGH SPEED
STEEL TOOLS:**
Rotary Burs
Rotary Files
Chatterless
Countersinks
Special Tools

All U.S. Steel & Carbide Tools enlarged and resharpened
(Write for catalogue)

ESSEX ROTARY FILE & TOOL CORP.
Makers of Fine Tools Since 1888
295 MADISON AVE. NEW YORK 17, N. Y.

For more data circle 539 on Reader Service Card

"PAK-N-STAK"

COPYRIGHT

The most economical LEAKPROOF,

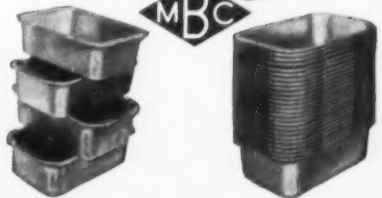
LIGHTWEIGHT, DRAWN TOTE PAN offered to industry

OUTSIDE DIMENSIONS

DEEP — 5 $\frac{1}{2}$ "

LONG — 18 $\frac{1}{4}$ "

WIDE — 10 $\frac{5}{16}$ "



There Are 25 Nested Tote Pans in Above Photo

WRITE FOR CATALOG AND PRICE

BATHEY MFG. CO.

100 SO. MILL ST.

PLYMOUTH, MICH.

For more data circle 527 on Reader Service Card

modern machine shop 261

new shop equipment . . .

the inaccessible places not ordinarily reached, giving an all-over coverage. There is no mess or fuss cleaning brushes and containers after use, and no loss due to evaporation or spillage as the unused material is always under seal in the pressure can. The utility kit does away with filling or carrying

bulky containers, brushes and oil cans. It is said to be ideal for maintenance, toolroom and service departments.

For more data circle 126 on Reader Service Card

★ ★ ★

ONE-SHOT LUBRICATION SYSTEM AVAILABLE FOR MARKERS

The Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn., has announced the availability of a Bijur "One-Shot" metered lubrication system as optional equipment for its line of general-purpose roll marking machines. The lubrication system incorporates standard components which provide effective lubrication for all bearings. It consists of a "one-shot" central lu-

G Bond wheels boost O.D. grinding profits

Users all over the country report Norton G Bond wheels have given them an entirely new slant on the profit-possibilities of their centerless and cylindrical grinding jobs. Among the advantages listed again and again are: *cooler cutting action . . . faster stock removal . . . better finish . . . longer wheel life . . . more pieces per dressing . . . easier dressing, with less wear on diamond or on crushing roll.*

The G Bond is the most efficient vitrified bond ever produced for precision and semi-precision grinding. See your Norton Distributor for facts on how G Bond wheels can bring the value-adding "Touch of Gold" to your O. D. grinding jobs. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1609

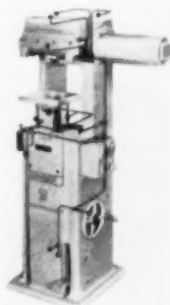
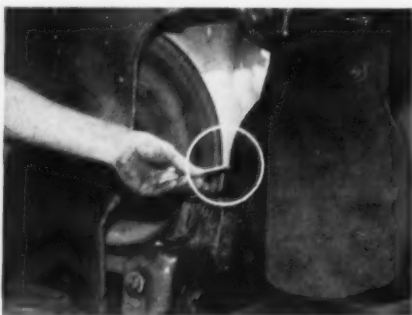
Making better products . . . to make your products better



and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

For more data circle 528 on Reader Service Card



Noblewest Roll Marker equipped with Bijur "One-Shot" Lubrication System

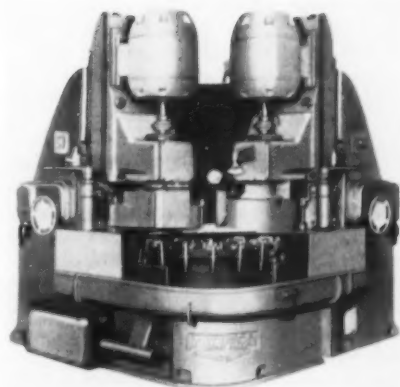
bricator and a distribution system and Meter-Units for each bearing served. The lubricator, a combination pump, reservoir and filter, contains a spring-loaded piston which is cocked simply by raising a pull-button. When the button is released, a measured quantity of filtered oil is forced into the distribution system automatically. The meter units at each of the 10 bearings distribute the oil according to the individual bearing requirements.

For more data circle 127 on Reader Service Card

★ ★ ★

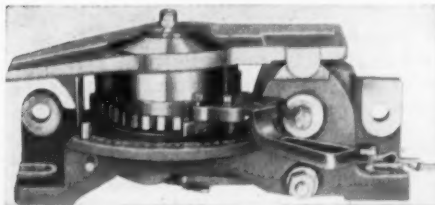
AUTOMATIC SINGLE-PASS GRINDER PROCESSES CONNECTING RODS

Mattison Machine Works, Rockford, Ill., has announced an automatic single-pass, double spindle, rotary table grinding machine for processing large



Mattison Automatic Single-Pass Grinder

truck engine connecting rods. Mechanical clamping and unclamping devices operate automatically as each work-holding fixture rotates past actuating

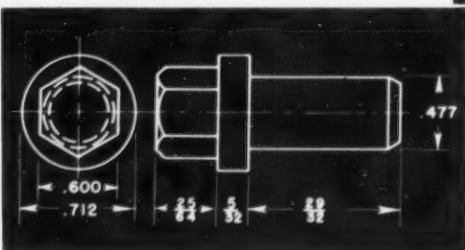


DEARBORN Automatic Chucking and Indexing Fixture

FEATURES:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

J. W. DEARBORN
ANSONIA • CONN.



Write for illustrated data. Send blue-prints or specifications of work.



For more data circle 529 on Reader Service Card

new shop equipment . . .

cams bracketing the loading station. Rough forgings are finished in one pass under the wheels. One wheel grinds the crank ends, the other the pin ends. Stock removal is said to be 0.008 inch on each side. Automatic down feed, actuated by sizer-gages which constantly and accurately check dimension being machined at each wheel head, compensates for wheel wear and permits uninterrupted production with only spot checking of parts for size. Step between two ends of the rods is held within 0.001 inch.

Wheels are self-dressing. Once the machine is set into motion, the only down time normally required is for replacing a wheel that has been worn beyond its useful limit. Production rate for two operations on two sides is claimed to be 400 rods per hour.

For more data circle 128 on Reader Service Card



Covell No. 12A Cutter and Tool Grinder

★ ★ ★ CUTTER AND TOOL GRINDER FEATURES TILTING HEAD

Identified as the No. 12A, a universal cutter and tool grinder which features a versatile Pope tilting head has been introduced by Covell Mfg. Co., Dept. P23, Benton Harbor, Mich. The head utilizes a direct 1-h.p. motor-

driven spindle. Cup wheels can be used for grinding practically all clearance angles, producing a strong, long-lasting cutting edge on tools. According to the manufacturer, most cutters and reamers can be ground all over with a single setup. Clearance angles can be read directly in degrees from the scale located on the head. Swivel and tilt clamps are quick acting.

For more data circle 129 on Reader Service Card



SPEEDY and SAFE CASE HARDENING WITH NO SPECIAL EQUIPMENT

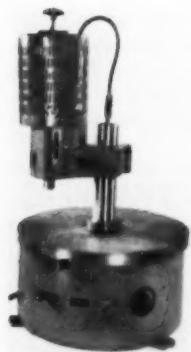
Indispensable for Machine Shops, Schools, Tool Rooms, Etc.
1 lb., 5 lb., 10 lb., 25 lb., 50 lb., 100 lb. containers.

KASENIT COMPANY
799 GREENWICH STREET BOX G NEW YORK 14, N. Y.

For more data circle 530 on Reader Service Card

ELECTRIC INDEX TABLE HAS COLUMN FOR MOUNTING TOOLS

Black & Webster, Inc., 445 Watertown St., Newton 58, Mass., has announced an electric indexing table for automatic work-positioning, featuring a central column on which tools may be mounted. The table is available both as a packaged unit with the company's Electropunch for staking, riveting or marking with the cycling of the table, or as a separate unit for use with other automatic tools. The all-electric table is completely self-contained and is said to be ideal for automation. A built-in automatic timer is continuously adjustable from 6 to 54 indices per minute and automatically triggers the tools when the table locks in position.



Black & Webster Electric Indexing Table equipped with Electropunch Unit

A 1/20-h.p. geared-head motor, running continuously, furnishes the power.

The automatic timer triggers a solenoid which operates a clutch on a cam. With each rotation of this cam, a nylon roller advances the table one station with a smooth Geneva action. The 15-inch table is locked securely by a ground pin engaging hardened, tapered bushings set in the table. According to

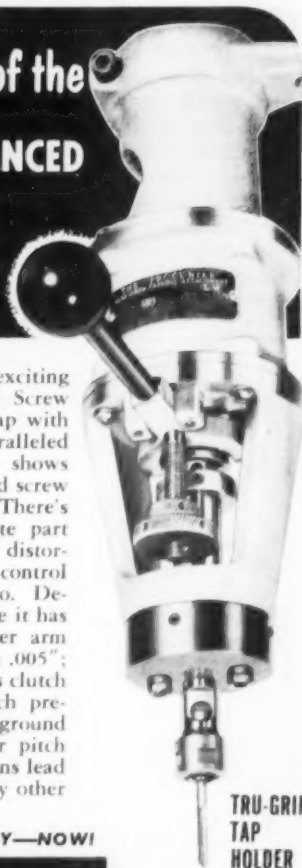
Get the full story of the newest MOST ADVANCED TAPPING UNIT EVER DEVELOPED

Illustrated brochure reveals the exciting story of a remarkable new Lead Screw Tapper. Tells how you can now tap with an ease and precision that's unparalleled in tapping history! Graphically shows how each part produced by this lead screw unit is "gauge perfect"—always! There's no variation—ever! You eliminate part spoilage, stripped threads, thread distortion. With the exclusive finger tip control you eliminate operator fatigue, too. Designed on a new operating principle it has many outstanding features: Trigger arm travels only $\frac{3}{8}$ " ; depth held within .005" ; depth stop automatically disengages clutch at bottom of stroke; friction clutch prevents tap breakage; hardened and ground lead screw replaces in seconds for pitch changes; unique wiper oils and cleans lead screw while in operation; plus many other features.

WRITE FOR YOUR FREE COPY TODAY—NOW!

Procurier Safety Chuck Co.

12 So. Clinton St., Dept. 8, Chicago 6, Ill.



TRU-GRIP
TAP
HOLDER

lighter, smaller, permits easier tapping close to walls and shoulders.

For more data circle 531 on Reader Service Card

new shop equipment . . .

the manufacturer, repeat accuracy is 0.001 inch, and no backlash can occur. The table will accommodate eight 3¾-inch diameter station fixtures.

For more data circle 130 on Reader Service Card

★ ★ ★

ROTARY HOPPER PROVIDES HIGH-SPEED PARTS DELIVERY

Designated as the "160," a rotary hopper designed to provide accurate, high-speed parts delivery to machine tools has been announced by Feedmatic, Inc., 22515 Telegraph Rd., Detroit 19, Mich. The hopper feeds parts to presses, grinders, special machines and machine tools, and can also be used for sorting, counting and inspection operations. According to the manufacturer, the hopper automatically feeds



Feedmatic "160" Rotary Hopper Unit

parts three to five times faster than hand-feeding methods.

The unit operates by means of a fully-enclosed, continuous-duty motor and has a slip clutch for overloads, which is easily accessible for adjustment. Twelve-pitch gears, mounted on ball-bearing shafts, are used throughout for continuous, heavy-duty performance. All gears and bearings operate in an oil bath.

The rotary hopper incorporates a three-point mounting in the base for easy installation on rough or uneven surfaces. The unit itself is fully-adjust-

Rivet Spinning on the LINLEY is fast, low in cost and noiseless

Save time and money by putting your riveting on the LINLEY RIVETER. Send us samples of your work and we'll gladly and without obligation give you estimates on the time and cost of handling your work the LINLEY way.

Available in sizes and types for iron and cold rolled steel rivets up to ¾"; larger rivets of softer materials can also be handled.

Send for Bulletin R TODAY!

LINLEY BROTHERS CO.

671 State St. Ext., Bridgeport 1, Conn



Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it!" Simple to operate.



*Write
for circular
and prices*

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 532 on Reader Service Card

For more data circle 533 on Reader Service Card

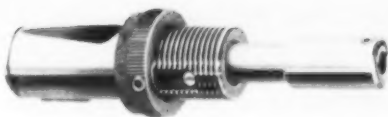
able to assure best feeding angle. The hopper can be supplied with as many as four separate feeding tracks.

For more data circle 131 on Reader Service Card

★ ★ ★

IMPROVED TENSION AND COMPRESSION TAP DRIVERS

Seibert & Sons, Inc., Chenoa, Ill., has announced the development of two improved adjustable tension and compression tap drivers for use in spindles taking adjustable adapter shank tools. Both drivers are self-adjusting, by spring action, to variation of feed between the spindle and the tap. The tension-type driver is designed for use when the spindle feed is less than the feed of the tap. The compression-type driver is used when the spindle feed is greater than the feed of the tap. The floating holders of the drivers have been designed to provide added strength and rigidity to the nose of the float. In the previous design, the nose of the holder was threaded on the o.d. and split on four sides; taps were held in the holder by tightening a large hex nut. With the new design, taps are held securely in place by a trepan clamp which is tightened by a set screw. According to the manufacturer, this design eliminates the hex nut which was difficult to work with in close center work and which, on occasion, would



Seibert Compression-Type Tap Driver

twist off the nose of the float if turned too tight. As an added safety feature, the drivers are engineered to shear the driving pin before stripping part threads or damaging any spindle or holder parts.

The tap drivers are precision built from high alloy steel, hardened and ground for perfect fit. Diameters are said to be held to 0.0003 inch, and total concentricity 6 inches from the nose is held to within 0.002 inch total indicator reading. Threads on the adapter body are ground to ensure Class 2 fit with Seibert Micro Nuts. The micro nut is graduated for accurate adjust-

**... for more than
1001 jobs**

HJORTH LATHE & TOOL CO.
8 BEACON STREET WOBURN, MASS.

For more data circle 534 on Reader Service Card

August, 1955

**5" Hinged
Sine
Plate**

**ONLY
\$109.50**

F.O.B. St. Paul

• Precision • Convenience • Economy

Exclusive locking device provides a rigid unit for operations such as grinding. May be used with a permanent magnetic chuck as illustrated (Chuck not included). Precision ground bodies double normalized for maximum stability. Solid oak case included. Write for information on other models.

Hardened Rolls	Specifications:
Sturdy End Plates	5" Hinged Sine Plate No. 1805
Tapped Holes	Center Distance 3" ± .0002"
Satisfaction	Rolls-Top, Base parallel..... .0002"
Guaranteed	Rolls Same Diameter..... .0001"
	3" wide x 8 1/2" long

Call Your Dealer or Wire Collect For Immediate Shipment.

Bald Eagle Tool Co.
357 Minnesota St. St. Paul 1, Minn.

For more data circle 535 on Reader Service Card

modern machine shop 267

new shop equipment . . .

ment and can be easily secured at any place on the threaded shank of the adapter body by tightening the set screw. The tap drivers are available in a wide range of sizes to meet high production speeds and close tolerance requirements.

For more data circle 132 on Reader Service Card

★ ★ ★

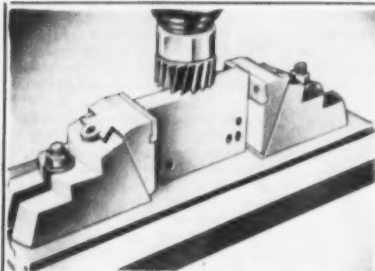
PRECISION BORING MACHINE PROVIDES SIMPLIFIED SETUP

Designated as the Unimatic, a precision boring machine which provides simplified setup and automatic controls has been announced by Atlantic Instrument Corp., 90 Broadway, Norwood, Mass. According to the manufacturer, job setup on the machine has been simplified to the point where very short runs can be efficiently made using unskilled labor. The machine has automatic and manual controls with timers for repetition of predetermined cycles for cutting, dwell and reverse motion of the table and cross slide. The machine can also perform high production runs. The Unimatic is capable of handling work up to 9 inches in diameter and can perform boring operations to a depth of 6 inches.



Atlantic Unimatic Precision Boring Machine

The headstock has a built-in sine bar to implement accurate boring and turning of tapers. An air-operated spindle brake and complete motorized coolant facilities are also features of the machine. Full round table ways and guide bushings and a "floating" support are said to assure correct tool position regardless of contraction and expansion of the machine due to changes in weather and temperature. A heavy



MASTER GRIPPING CLAWS

System Hubner

WHY use them?

1. Clamping action Vertical as well as Horizontal—pressing workpiece down directly on the machine table. No hammering and still no air between.
2. Gain more working room.
3. Faster and more secure setups. Easier to handle.
4. Unlimited jaw opening.
5. No straps overlapping on the workpiece; more machining surface.
6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

Exclusive Agents: **KARL A. NEISE, 404 Fourth Ave., New York 16, N. Y. Dept. MMS.**

For more data circle 536 on Reader Service Card

black granite base, ground and lapped to an accuracy of 0.00005 inch; and versatile cartridge-type ball bearing spindle; and a complete line of accessories contribute to the flexibility and accuracy of the machine. The motor is a 1/2-h.p., 1,750-r.p.m., totally-enclosed, sleeve bearing type, with spindle speeds available from 775 to 4,000 r.p.m. Total weight of the machine is 1,200 pounds, and the Unimatic requires a floor space of 28 x 52 inches. For more data circle 133 on Reader Service Card

★ ★ ★

METAL-CUTTING BAND SAW HAS LARGE CAPACITY

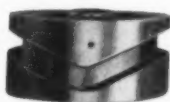
Identified as the Model "A," a metal-cutting band saw which has a capacity of 6 x 11 inches has been announced by W. F. Wells & Sons, Three Rivers, Mich. Ruggedly constructed throughout, the machine has sturdy welded angle iron legs, ideal for heavy cutting operations. The sawing machine features precision saw guides; adjustable cutting pressure; automatic blade shut-



Wells Model "A" Metal-Cutting Band Saw

off; quick-action swivel vise; and rotary blade brush. Rate of descent is adjustable for cutting tubing and for light work. The 1/2-inch blade is offset from the guide beam. Overload protection is provided for the 1/3-h.p. drive motor. With the addition of a table, the machine can be used in a vertical position for contour work.

For more data circle 134 on Reader Service Card



CAMS

All types made complete to your specifications.

Write for free bulletin.



SHAKER TOOL & DIE COMPANY

8 Broadway 1-5300

9821 Bessemer Ave., Dept. C, Cleveland 4, O.

For more data circle 537 on Reader Service Card

GAGE INDICATOR POINTS WITH TUNGSTEN CARBIDE BALLS



- LONGER LIFE
- SUSTAINED ACCURACY

Points available FROM STOCK for Last Word, Gem, and Federal Testmasters, 1/10 type short and 1/1000 type long. Please specify size and make.

\$4.50 each

(Prices on other makes and for other wear parts quoted on application.)

ORDER TODAY.

WESTFIELD GAGE COMPANY
55 CHURCH ST. WESTFIELD, MASS.

For more data circle 538 on Reader Service Card

new shop equipment . . .

RUBBERIZED ABRASIVE KIT FOR DEBURRING, SMOOTHING AND POLISHING

Cratex Mfg. Co., 81 Natoma St., San Francisco 5, Calif., has announced a rubberized abrasive kit which is designed for deburring, smoothing and polishing applications. The kit contains an assortment of 24 of the most popular Cratex polishing wheels, cones, blocks and mandrels. According to the manufacturer, the kit can be used for cleaning and polishing molds, dies and castings; for removing film, coatings and enamel; for blending in and polishing welded seams after rough grinding; for polishing bearing surfaces and race-



Cratex Rubberized Abrasive Polishing Kit

ways; for cleaning and polishing commutators and contact points; and for removing rust, heat marks, tarnish, excess solder, scratches and corrosion. Each polishing kit contains full instructions on the application of the abrasives.

For more data circle 135 on Reader Service Card

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

For further information
on any product mentioned
in this issue — use the

READER SERVICE CARDS

opposite pages 32 and 292.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

GRIND THE *Eastern Centerless Way*

Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 540 on Reader Service Card

For Your Convenience . . .

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 272, 274, 276, 278 and 280.)

MODERN MACHINE SHOP
431 MAIN STREET • CINCINNATI 2, OHIO

3-D Binocular Magnifier Used in Toolroom

The accompanying illustration shows a Cutler-Hammer toolroom employee using a "Magni-Focuser," manufactured by Edroy Products Co., New York 17, N. Y., to read a vernier height gage. This is one of the many uses for the binocular magnifier which is designed to give three dimensional magnification with needle sharp vision. Note how the user has both hands free to work.

The finest crown optical glass is used for the matched and balanced prismatic lenses. The "Magni-Focuser" can be worn with or without eye glasses and weighs only three ounces.

For more data circle 136 on Reader Service Card



Cutler-Hammer Toolroom employee uses "Magni-Focuser" to read vernier height gage.

August, 1955

4 Reasons why you should use **GAMMONS DIE REAMERS**



Specially treated for today's modern die steels.



Rapid cutting capacity.



Tapers per inch .005, —.008, —.013 in stock.



Large range of standard sizes in stock at all times for your convenience.

WRITE FOR
COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.

MANCHESTER 2,

CONN.

Manufacturers of helical taper pins, chucking, die makers and special reamers.

For more data circle 541 on Reader Service Card

modern machine shop 271

where to get it

Numbers shown are page numbers in this issue

A

Abrasives, Grain, Cloth, Paper, Disc, etc., 33, 50, 51, 162, 197, 262, 279
Adhesives, 193
Air Operated Equipment (Look for specific item)
Alloys, 226
Amplifiers, Electronic, 86
Angles, 14, 15, 219
Arbors, 176
Automated Equipment (Look for specific item)

B

Balancing Machines, 7, 23, 180
Balancing Ways, 232, 245
Bar Machines, Automatic, 148, 149, 187
Bar Stock, 226
Bases, Magnetic, 194
Bearings, Ball, 30
Bearings, Bronze, 275
Bearings, Roller, 30
Bearings, Thrust, 30, 227
Belting, 193
Belts, Flat, 193
Belts, V, 193
Benches, Work, 192
Bending Devices, 210, 218
Bending Machines, 98, 204
Blades, Carbide, 226
Blades, Shear, 32
Blocks, Step, 102
Blocks, V, 219
Bolts, 102, 213
Boring Bars, 79, 87, 144
Boring, Drilling and Milling Machines, 35
Boring, Facing and Turning Machines, 35

Boring Heads, 79, 195, 251
Boxes, Stacking, 227
Brakes, Press and Bending, 34, 60, 61, 223
Brass, 57
Broaches, 252
Broaching Kits, 252
Broaching Machines, 92
Bronze Bars, 275
Buffers, Bench and Pedestal, 292, 242
Buffing Machines, 292, 242
Burs, 261
Bushings, Brass, Bronze, etc., 275
Bushings, Drill Jig, 25, 49, 146, 220, 230, 255
Bushings, Sleeve, 226
Bushings, Threaded, 248

C

Cam Making Machines, 237
Cams, 230, 233, 237, 245, 269
Carbides, 226
Centers, Index, 205
Centers, Lathe, Planer, Miller, etc., 53, 65, 176, 213
Chamfering Machines, 204
Chasers, 287
Chippers, Portable Pneumatic, 135
Chucking Fixtures, 247
Chucking and Indexing Fixtures, Combination, 263
Chucking Machines, Automatic, 148, 149
Chucks, Air and Hydraulic, 97
Chucks, Collet, 176, 228
Chucks, Lathe, 96, 247
Chucks, Magnetic, 14, 15, 67, 96, 254
Chucks, Universal, 96
Clamp Components, 268
Clamps, 11, 63, 102, 236, 268
Collet Controllers, 131
Collets, 176

In Defense or Peace

ECLIPSE *Specials*

.... ARE THE BEST BUY!



Eclipse Radial Drive High Speed Steel Cutter bores 5 diameters in steel part.



Special Cutter forms ball seat in road building machinery unit.



Tungsten Carbide Tipped Cutter precision bores three diameters in aluminum gear case.

Radial Drive Tungsten Carbide Tipped Cutter bores gear pocket in oil pump.



Multi-diameter cutter with Tungsten Carbide Tipped inserted blades for boring, counterboring and chamfering.

Since 1913—through two wars and during the peace years—Eclipse has met the exacting and changing demands of industry for special purpose end cutting tools. What better test? What better recommendation? Our large modern plant can serve you, too. Send your problem to us, today!

ECLIPSE COUNTERBORE CO.

Founded in 1913

DETROIT 20, MICHIGAN

For more data circle 542 on Reader Service Card

August, 1955

modern machine shop 273

where to get it . . . (Numbers shown are page numbers in this issue)

Comparators, 209
Compressors, Air and Gas, 84, 85, 168
Coolant Compounds, 81, 246
Coolants, 81
Counterbores, 166, 273
Countersinks, 211, 261
Couplings, 229
Cutters, Gear, 151
Cutters, Keyway, 207
Cutters, Milling, 55, 77, 184
Cutting Fluids, 81
Cutting Oil Compounds, 246
Cylinders, Hydraulic and Pneumatic, 97, 178, 179, 215

D

Deburring Machines, 204
Demagnetizers, 96
Die Cushions, Pneumatic, 34
Die Heads, 2
Die Sets, 41
Die Sinking Machines, 42
Die Springs, 41
Diemakers' Supplies, 41
Dies, Punching or Forming, 223, 226, 236
Disintegrators, Metal, 64
Dividing Heads, 96, 227, 235, 243
Drawing Compounds, 59
Dressers, Grinding Wheel, 208
Dressing Fixtures, Grinding Wheel, 11, 216
Dressing Sticks, 33
Drifts, Drill, 176
Drill Heads, 21, 58, 195, 214, 221
Drill Sharpeners, 221
Drilling Machines, Bench, 153
Drilling Machines, Radial, 10, 22, 36, 37, 83, 136
Drilling Machines, Sensitive, 36, 37, 173
Drilling Machines, Turret, 69
Drilling Machines, Upright, 36, 37, 136
Drilling Machines, Unit Type, 16, 17
Drilling Machines, Vertical, 20, 22, 153, 180
Drilling, Chamfering and Tapping Machines, Combination, 143
Drilling, Reaming and Tapping Machines, 21
Drilling Units, 16, 17, 83, 206, 281

Drills, Center, Core, Twist, etc., 184, 201, 206, 207, 224, 233
Drills and Countersinks, Combination, 32
Drills, Portable Electric, 155
Drills, Portable Pneumatic, 135
Duplicating Machines, 72
Dust Control Equipment, 182, 238
Dynamometers, 86, 180

E

End Mills, 47, 184, 201, 261
Engines, Diesel, 84, 85
Etchers, 215

F

Facing Heads, 251
Feed Units, 68, 70, 190, 229
Feeler Gage Stock, 205
Files, 141
Files, Rotary, 261
Filing Machines, 240, 241
Finishing Machines, 204
Fittings, Air Line, 97
Flexible Shaft Equipment, 155
Fluids, Cutting, 81
Forming Machines, 68, 90, 219
Furnaces, Heat Treating, 199

G

Gage Blocks, 56, 86
Gages, 14, 15, 56, 73, 86, 152, 189, 218, 234
Gear Burring Machines, 52
Gear Chamfering Machines, 52
Gear Cutting Machines, 5
Gear Measuring Instruments and Machines, 56
Gear Shaving Machines, 151
Gear Testing Machines, 233
Gear Tooth Pointing Machines, 52
Gear Tooth Rounding Machines, 52
Grinders, Abrasive Band and Belt, 222
Grinders, Air, 241
Grinders, Bench, 155, 242
Grinders, Cam, 237
Grinders, Carbide Tool, 222



ask your
Bunting
distributor...

**JUST DIAL
HIS NUMBER**

Your Bunting Distributor carries in stock completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. He is an industrial distributor or a specialist in certain industrial items. Ask him for the Bunting Catalog or write.



**... for this speedy
cost-saving bearing service**

The local availability of Bunting completely machined and finished bronze bearings and bars is saving money, time and trouble in machinery maintenance everywhere in America. Stocks of Bunting Bronze Bearings and Bars constantly carried by Bunting Distributors are adequate to supply the needs of the whole nation for an indefinite time.

Bunting

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

**THE BUNTING BRASS AND BRONZE COMPANY
TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES**

For more data circle 543 on Reader Service Card

where to get it . . . (Numbers shown are page numbers in this issue)

Grinders, Center Type, 8, 9
Grinders, Centerless, 8, 9
Grinders, Cutter and Tool, 42, 50, 51,
72, 76, 153, 222, 240, 262
Grinders, Cylindrical, 8, 9, 262
Grinders, Drill, 42, 76, 292
Grinders, Face Mill, 42
Grinders, Flute, 240
Grinders, Pedestal, 242
Grinders, Portable Electric, 155, 196,
281
Grinders, Portable Pneumatic, 135
Grinders, Portable and Tool Post, 24
Grinders, Saw, 240
Grinders, Surface, 14, 15, 39, 76, 101,
183, 277
Grinders, Swing Frame, 239
Grinders, Tap, 240
Grinders, Thread, 2
Grinders, Universal, 156, 157
Grinders, Valve Face, 155
Grinding Fixtures and Attachments,
64, Third Cover
Grinding Wheels, 50, 51, 71, 183, 193,
262
Guards, Saw, 257

H

Hammer Molds, 266
Hammers, Portable Pneumatic, 135
Hand Tools, Power (Look for specific
item)
Handles, Machine, 209
Handwheels, 209
Hardening Compounds, 264
Hardness Testing Devices, 43, 86, 216
Hinges, 224
Hobbing Machines, 175
Holders, Tap, 265
Hones, 162
Honing Machines, 6
Hose, Air, 193
Hose Fittings, Air and Welding, 193
Hydraulic Equipment (Look for specific
item)

I

Indicator Points, 269
Indicators, 86, 189

J

Jacks, Setup, 102
Jig Bore, 36, 37, 208, 245
Jig Mills, 93
Jigs and Fixtures, 73
Joints, Expanding, 193

K

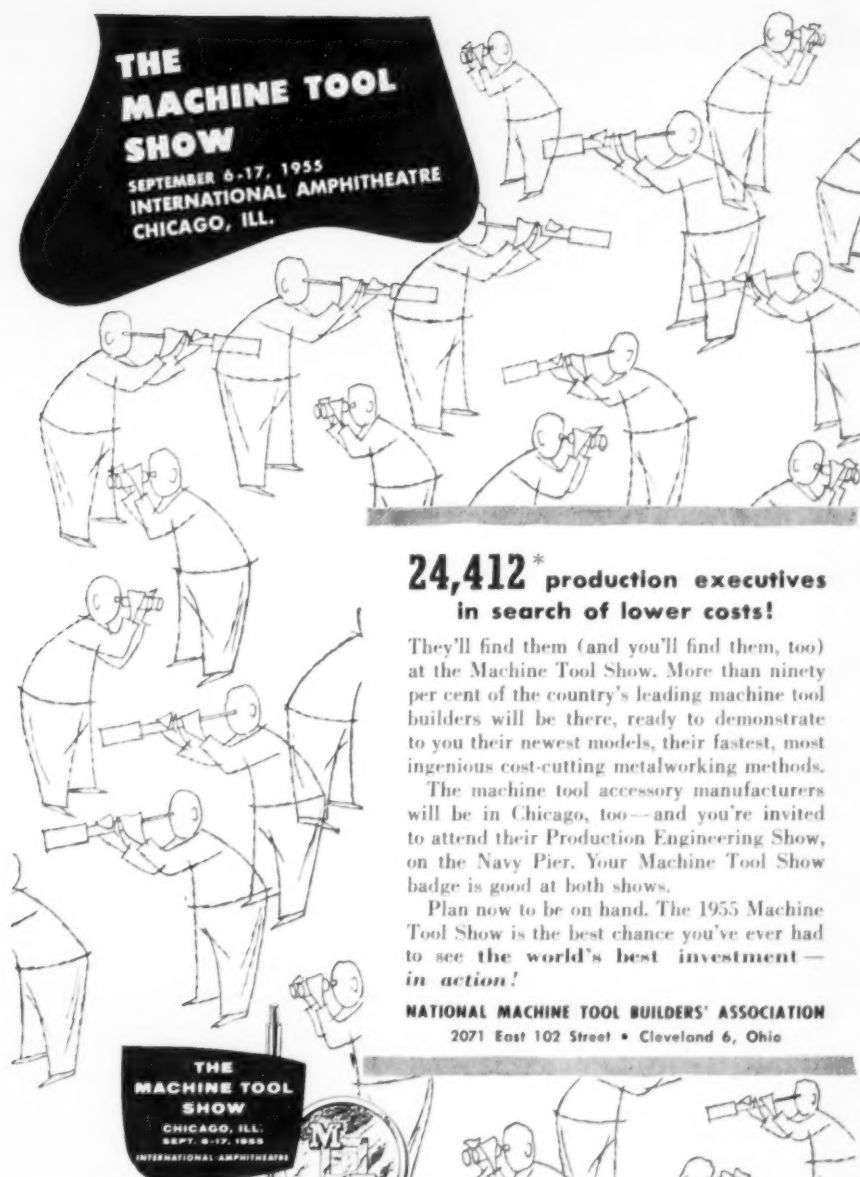
Keys, Machine, 215, 231, 258
Keys, Woodruff, 215, 231, 243, 258
Keyway Cutting Machines, 236
Knees, Toolmakers', 219
Knobs, Hand, 209

L

Lapping Machines, 8, 9, 91
Lathes, Automatic, 7, 23
Lathes, Bench, 153
Lathes, Engine and Toolroom, 12, 13,
21, 26, 27, 74, 75, 94, 147, 153, 156,
157, 167, 267
Lathes, Tracer, 3
Lathes, Turret, 7, 23, 38, 148, 149, 153
Lathes, Vertical Turret, 35
Layout Materials, 223, 230
Lifting Machinery, Portable, 283
Light Wave Measuring Equipment,
56
Lighting Equipment, 243, 260
Loaders, 21
Locks, Control, 82
Lubricants, 231

M

Magnetic Fixtures, 254
Magnifiers, 213
Mallets, Rawhide, 142
Mandrels, Lathe, 207
Marking Devices, 88, 177, 209, 211, 237
Matrixes, 203
Mats, 193

A large, stylized illustration of numerous people, depicted in a simple, line-art style, looking through various types of telescopes and binoculars. They are scattered across the page, some standing, some crouching, all focused on their viewing devices. The illustration is positioned behind the main text blocks.

THE MACHINE TOOL SHOW

SEPTEMBER 6-17, 1955
INTERNATIONAL AMPHITHEATRE
CHICAGO, ILL.

24,412* production executives in search of lower costs!

They'll find them (and you'll find them, too) at the Machine Tool Show. More than ninety per cent of the country's leading machine tool builders will be there, ready to demonstrate to you their newest models, their fastest, most ingenious cost-cutting metalworking methods.

The machine tool accessory manufacturers will be in Chicago, too—and you're invited to attend their Production Engineering Show, on the Navy Pier. Your Machine Tool Show badge is good at both shows.

Plan now to be on hand. The 1955 Machine Tool Show is the best chance you've ever had to see the world's best investment—in action!

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION
2071 East 102 Street • Cleveland 6, Ohio

A circular logo featuring a stylized 'M' and 'T' intertwined, with the words 'MACHINE TOOL SHOW' around the perimeter.

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

* Estimated Attendance.
Before Receiving Your Reservation

For more data circle 544 on Reader Service Card

where to get it . . . (Numbers shown are page numbers in this issue)

Measuring Attachments, Lathe, 250
Metallizing Equipment, 185
Micrometers, 56, 86
Microscopes, 225
Milling Heads, 148, 149, 195
Milling Machine Attachments, 163
Milling Machines, Cam, 237
Milling Machines, Horizontal, 22, 72,
163, 167
Milling Machines, Vertical, 72
Mills, Hollow, 239

N

Nails, 231
Nibblers, 225
Nut Runners, Portable Electric, 84, 85
Nut Runners, Portable Pneumatic, 46,
84, 85
Nuts, 102

O

Oils, Cutting, Second Cover, 44, 45,
133
Oils, Grinding, Second Cover
Oils, Hydraulic, Second Cover
Oils, Soluble, Second Cover

P

Packings, 193
Pans, Tote, 245, 261
Pantographs, 72, 95
Parallels, 219
Parts, Machine Tool, Production, Air-
craft, etc., 25, 146, 231
Parts Separators, Magnetic, 202
Pins, Dowel, Taper, etc., 205, 208, 215,
231, 248, 258
Pins, Stop, 166
Pipe, Plastic, 193
Planer-Millers, 22
Planers, 89
Plates, Angle, 219, 223, 231
Plates, Lapping, 219
Plates, Sine, 14, 15, 73, 267
Plates, Surface, 14, 15, 219

Pliers, 63
Polishers, Portable Electric, 155
Positioning Machines, Automatic, 36,
37
Power Units, Hydraulic and Pneu-
matic, 97
Presses, Air, 20, 97
Presses, Arbor, 20
Presses, Assembly, 249
Presses, Foot, 20
Presses, Hydraulic, 34, 97, 99
Presses, Power, 20, 190, 191
Presses, Punch, First Cover, 34, 186,
198, 200
Presses, Straightening, 217
Presses, Stretching, 90
Presses, Sub, 190
Pulleys, 193
Pumps, Coolant and Lubricant, 97,
285, 256
Pumps, Vacuum, 84, 85
Punches, 25, 191, 236
Punching Machines, 90
Pyrometers, 176

Q

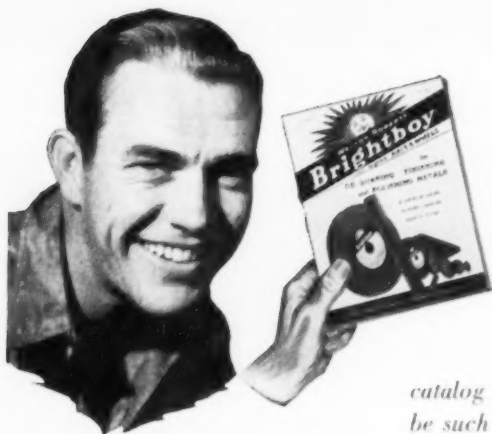
Quills, 215, 244

R

Racks, Machine, 215, 231
Rammers, Portable Pneumatic, 135
Reamers, 32, 201, 207, 233, 251, 261,
271
Rectifiers, 96
Reels, 68
Refractories, 50, 51, 262
Riveting Machines, 90, 207, 221, 266
Rolls, 226

S

Sandblast Equipment, 217
Sanders, Portable Electric, 155
Sanders, Portable Pneumatic, 135



"Boy! Are These New Finishing Hints A Help!"

"Our plant is 'right on the beam.' But not until we received this new Brightboy catalog did we realize that there could be such a completely new, wider concept of finishing and so many time-saving abrasive applications."

You can choose a rubber-cushioned Brightboy stock abrasive particularly matched for a given job.

You can eliminate the annoyance, expense and delivery delay of made-to-order "specials."

You can count on dependable uniformity, prompt delivery.

Brightboy is available in both Silicon Carbide and Aluminum Oxide Grains. In both grains you have wide selection of uniform textures and grain sizes ranging from extra fine to extra coarse, in soft, firm and tough rubber binders.

Ask your dealer NOW for details on multi-use Brightboy, and for this new Brightboy catalog. Advise us if he cannot supply you. Write us on any problem where finishing is involved.

- Brightboy's big advantages lie in its unique working
- action. This is the result of rubber and abrasive,
- working simultaneously. Rubber binders of special
- textures are "matched" with selected abrasives of
- various grains. Each abrasive is uniform in disper-
- sion through its "cushioning" rubber binder.
- Brightboy often burrs, cleans, finishes, polishes, in
- one operation. Time savings frequently amount to
- 50% over other methods.
- A Brightboy precision-
- finish often constitutes
- the final polish. Alert
- production men ex-
- plore Brightboy ap-
- plications as regular
- routine prior to set-
- ting up new jobs
- and to find addition-
- al cost-savings on
- current production.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

For more data circle 545 on Reader Service Card

where to get it . . . (Numbers shown are page numbers in this issue)

Sanding Machines, Belt and Disc, 235
Saw Blades, Circular, 22, 32
Saw Blades, Slitting, 184
Saw Sharpening Machines, 22
Sawing Machines, Band, 20, 257
Sawing Machines, Circular, 22
Sawing Machines, Hack, 28, 96
Saws, Portable Electric, 155
Screw Drivers, Portable Electric, 84, 85
Screw Drivers, Portable Pneumatic, 46, 84, 85, 135
Screw Machines, Automatic, 72
Screws, Cap. Set. Socket and Machine, 145, 213, Fourth Cover
Screws, Transfer, 224, 239
Separators, Magnetic, 202
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 91, 205, 208, 215, 230, 233, 237, 245, 270
Shapers, 60, 61, 153, 167
Shearing Machines, 4, 54, 60, 61, 137
Shears, Bench, 225, 259
Shears, Squaring, 20
Sheaves, 193
Shim Stock, 188, 205
Shims, 188
Sleeves, 176, 215
Slotting Machines, 205
Sockets, 176
Solenoids, 148, 149
Spacers, Arbor, 205
Special Machinery, 7, 16, 17, 22, 23, 52, 58, 73, 143
Speed Reducers, 231
Spindles: Grinding, Boring, Milling, etc., 24, 146, 215, 289
Spring Coilers, 181
Staking Machines, 207
Stampings, Pressed Metal, 253
Steel, Die, 62
Steel, High Speed, 66
Steel, Tool, 78
Stops, Drill, 237
Straightedges, 219
Straightening Machines, 229
Studs, 213
Superfinishing Machines, 7, 23
Swaging Machines, 31
Switches, 148, 149
Switches, Demagnetizing, 96

T

Tables, Elevating, 171, 212
Tables, Rotary and Index, 169, 205, 231, 243, 249
Tapes, Pressure Sensitive, 50, 51, 262
Tappers, Hand, 203
Tapping Heads, 58, 214, 221, 265
Tapping Machines, 207
Taps, Collapsible, 2
Thread Rollers, Automatic, 2, 148, 149
Threading Attachments, 2
Threading Machines, 2, 40, 80
Tool Bits, 48
Tool Posts, 281
Tools, Balancing, 232
Tools, Boring, 79, 87
Tools, Carbide, 226, 261
Tools, Carbide-Tipped, 201
Tools, Dressing, 208
Tools, Form, 235
Tools, Grooving, 29
Tools, Honing, 162
Tools, Knurling, 241
Tools, Nibbling, 225
Tools, Special Cutting, 146, 201, 261
Tools, Threading, 148, 149
Transfer Processing Machines, Automatic, 22
Triangles, Shop, 56
Turrets, Lathe, Tool Post, Bed and Tailstock, 231

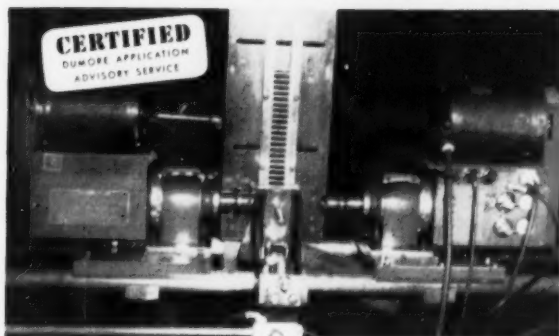
V

Valves, 97
Vises, Bench and Machine, 11, 96, 181, 203, 205, 217, 239, 245

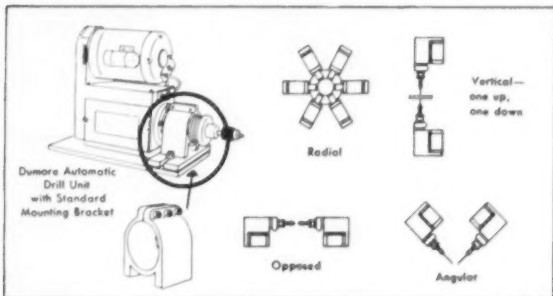
W

Washers, 209
Wipers, Industrial, 18, 19
Wire Straighteners, 68, 229
Wires, Measuring, 56
Wrenches, Impact, 155
Wrenches, Torque, 211

Facing-Deburring Job Speeded Up 300% with Versatile DUMORE Automatic Drill Units



This "Special" Machine, constructed from standard parts, faces and deburs four times as many steel pipe sections as the previous method. As each part falls from the hopper to the fixture, an automatic switch actuates a clamping device to hold the part. The two Dumore Automatic Drill Units, also actuated, advance, face and deburr the ends simultaneously, and retract to starting position—all automatically.



Key to Simplicity of the Dumore Automatic Drill Unit is the standard mounting bracket which permits quick removal and transfer of Dumore Units to other shop operations. These low cost brackets quickly adapt Dumore units...at any angle...to existing shop equipment. Dumores are delivered complete and ready to be used. All controls, electrical and pneumatic are built in.

VISIT THE DUMORE BOOTH, 547, PRODUCTION ENGINEERING SHOW,
NAVY PIER, CHICAGO, SEPT. 6-16.



DUMORE



**AUTOMATIC
DRILL UNITS
TOOL POST
AND HAND
GRINDERS**

1362
Seventeenth St.,
Racine,
Wisconsin

For more data circle 546 on Reader Service Card

Star Tubular Products Co. of Chicago wanted to step-up production of their welded steel pipe sections. The process required handling each part three times: facing and deburring one end, removing and reversing the part, facing and deburring the other end. Output was 135 pipe nipples per hour. Dumore was asked to find a better, faster method.

Technical Application Aid

Dumore's Application Advisory Service recommended a set-up that resulted in the machine pictured at the left: two Automatic Drill Units opposing each other with a hopper feed for the pipe sections in the center. As each pipe section falls into the fixture, it actuates the Automatic Drill Units which move in and face and deburr each end simultaneously, retract to starting position, actuate work feed and advance again—all automatically.

Production Goes Up

The set-up, simple and inexpensive, boosted production to 500 parts per hour—a 300% increase. In addition, the accuracy of this finishing process permitted the company to roll-cut their tubing, instead of square cutting, reducing the cut-off operation time by 300%!

Let Dumore's Application Advisory Service help you get increased production and lower costs. Write for FREE Dumore Application Analysis Kit.

the last word

By Fred W. Vogel, Editor

HUMAN RELATIONS

One day recently while talking with a neighbor of ours we fell to talking on the subject of human relations. Our neighbor, who is an executive concerned with human relations at one of the larger manufacturing firms, produced a folder in which were outlined "Thirty Effective Rules for Better Human Relations." We were so impressed with these rules, that we thought the readers of *Modern Machine Shop* might also be interested in same; therefore, we are presenting these rules herewith through the courtesy of our neighbor and the Queen City Chapter of the Dale Carnegie Club International:

Talk about your own mistakes before criticizing others.

Honestly try to see things from other person's point of view.

Remember to give other person a fine reputation to live up to.

Unfold with praise and honest appreciation.

Have genuine interest in others.

Use encouragement.

Make other person feel important.

Arouse in others an eager want.

Never criticize, condemn or complain.

Refer to others' mistakes indirectly.

Encourage others to talk about themselves.

Let others do a great deal of the talking.

Always let others feel the idea is theirs.

Talk in terms of other man's interests.

If you are wrong admit it quickly and emphatically.

Only way to get best of an argument is to avoid it.

Never tell a man he is wrong.

Sincerely make the other person happy in doing thing you suggest.

We appeal to the nobler motives.

Elicit a challenge.

Forever smile.

Immediately get others saying yes, yes.

Never be unsympathetic with others' ideas and desires.

Dramatize your ideas.

Praise the slightest improvement.

Every day give honest, sincere appreciation.

Ask questions instead of giving direct orders.

Remember a man's name is the most important sound to him.

Let the other man save his face.

Start in a friendly way.

It is suggested that the reader practice using a different rule each day for thirty days and repeat the cycle until all rules become second nature to him.

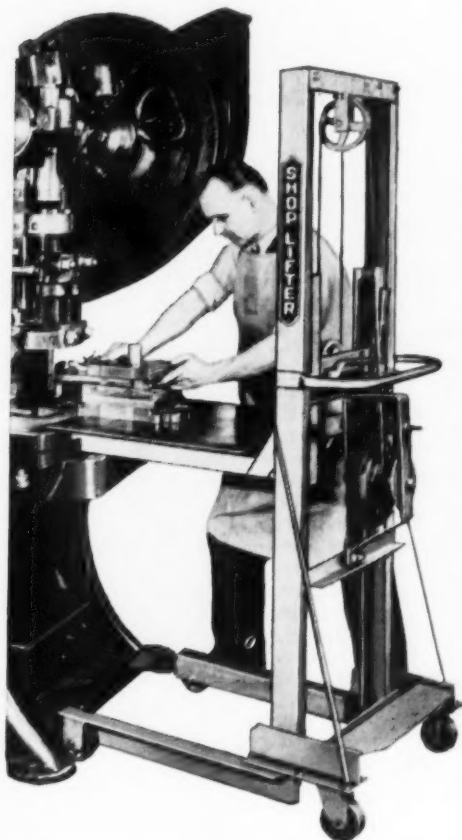
Economy

SINCE 1901

How would one man alone
handle a 500 lb. die without a

SHOPLIFTER

Use the SHOPLIFTER to avoid risk of painful accidents and to protect costly dies. Transport dies from storage area to press. To move dies in and out of press. Use it as an adjustable height bench for working on dies.



Platform lift 4'-6", high enough for all press beds, yet overall height will clear any standard doorway.

Width 24". Moves easily between machines — in confined areas.

Spur gear hoist unit — most efficient hoist mechanism — lifts capacity load with only 20# crank pressure.

Friction disc clutch holds load securely — automatically.

Big safety factor for occasional overloading when necessary.

Dependable. Trouble free service for years. Low first cost combined with little or no maintenance cost.

Simplicity of design. Any mechanic can disassemble and replace worn parts when necessary.

Three capacities to choose from

Type D (illustrated) 500 lbs. capacity	\$183.60
Type DX — 1000 lbs. capacity....	350.00
Type DX — 2000 lbs. capacity....	420.00

Write for New Economy Catalog 55 describing all Economy standard products, special engineered overhead service lifters and material handling machines.



ECONOMY ENGINEERING CO., 4507 W. Lake St., Chicago 24, Illinois

Eastern sales office, 342 Madison Ave., New York 17, N.Y.

For more data circle 547 on Reader Service Card

August, 1955

modern machine shop 283

index to advertisements

**For listing of products offered by
these advertisers consult the
Where To Get It Section**

A

Abrasive Machine Tool Co.	39
Abrasive Products, Inc.	197
Accurate Bushing Co.	25
Ace Drill Bushing Co.	255
Acme Tool Co.	219
Adjustable Clamp Co.	236
Agel Mfg. Co.	182
Albertson & Co., Inc.	155
All American Tool & Mfg. Co.	241
Allegheny Ludlum Steel Corp.	78
American Brass Co.	57
American Chain & Cable Co., Inc.	43
American Drill Bushing Co., Inc.	49
American Hollow Boring Co.	215
American Positive Grip Vise Corp.	217
Ames Co., B. C.	189
Anderson Bros. Mfg. Co.	245
Armstrong-Blum Mfg. Co.	28
Armstrong Bros. Tool Co.	102
Auto Moulding & Mfg. Co.	224

B

Bald Eagle Tool Co.	267
Barnes Drill Co.	162
Bathey Mfg. Co.	261
Bellows Co.	131
Beverly Shear Mfg. Co.	259
Black Drill Co.	206
Blanchard Machine Co.	183
Boye & Emmes Machine Tool Co.	147
Brewster-Squires Co.	215
Brighton Screw & Mfg. Co.	145
Brown & Sharpe Mfg. Co.	77
Buckeye Tools Corp.	46
Buffalo Mchry. Co., Inc.	229

Bullard Co.	35
Bunting Brass & Bronze Co.	275

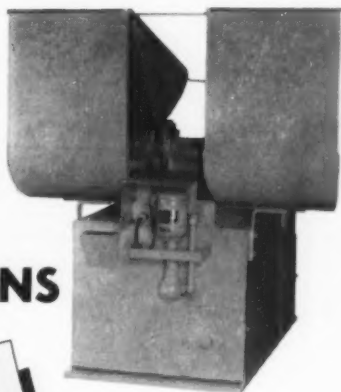
C

Carroll Dividing Head Co.	227
Cerro de Pasco Corp.	203
Chicago Mfg. & Dist. Co.	231
Chicago Pneumatic Tool Co.	84, 85
Chicago Rawhide Mfg. Co.	142
Cincinnati Bickford Tool Co.	136
Cincinnati Electrical Tool Co.	24
Cincinnati Gilbert Machine Tool Co.	10
Cincinnati Milling Machine Co.	8, 9
Cincinnati Milling Machine Co., Cincinnati Milling Products Div.	71, 81
Cincinnati Shaper Co.	60, 61
Circular Tool Co.	32
Cleveland Crane & Engr. Co.	54
Cleveland Punch & Shear Wks. Co.	191
Collis Co.	176
Commander Mfg. Co.	221
Commercial Centerless Grinding Co.	205
Comtor Co.	234
Connors & Davis Sales Corp.	181
Cook, Inc., L. H.	266
Cooley Electric Mfg. Corp.	199
Cooper Weymouth, Inc.	229
Coulter Machine Co., James	40
Covel Mfg. Co.	76
Cross Co.	52, 82
Crucible Steel Co. of America	66
Custom Scientific Instruments, Inc.	243

D

D & M Guard Co.	257
Danly Machine Specialties, Inc.	41

**FOR A
WIDE
DIVERSITY
OF
APPLICATIONS**



**Ruthman
GUSHER**
Coolant Pumps

Illustrated is a SUN
Glass Grinding Ma-
chine equipped with
a Ruthman Gusher
Coolant Pump.



Gusher Coolant Pumps are versatile. They come in a wide diversity of models to fit almost every application. All models give the same instantaneous Coolant flow, and efficient day in, day out service. The electronically balanced rotating assembly, heavy duty pre-lubricated ball-bearings assure you of long, trouble-free service at minimum maintenance cost. Write for our catalogue today.

MODEL 11022

THE **RUTHMAN** MACHINERY CO



1817 READING ROAD

•

CINCINNATI 2, OHIO

For more data circle 548 on Reader Service Card

index to advertisements . (For listings of products consult Where To Get It Section)

Davis Boring Tool Div.,	
Giddings & Lewis Machine Co.	87
Dearborn Co., J. W.	263
Detroit Boring Bar Co.	144
Detroit Harvester Co.	256
Detroit Power Screwdriver Co.	70
Detroit Stamping Co.	205
DeVlieg Machine Co.	93
DeVlieg Microbore Co.	79
Donovan Mfg. Co.	203
Dreis & Krump Mfg. Co.	223
Dremel Mfg. Co.	196
duMont Corp.	48, 194, 252
Dumore Precision Tools	281
Dykem Co.	223

E

Eastern Centerless Grinding Co.	270
Eastern Machine Screw Corp.	287
Eclipse Counterbore Co.	273
Economy Engr. Co.	283
Edroy Products Co.	213
Eisler Engr. Co., Inc.	245
Elgin Tool Wks., Inc.	3
Elox Corp. of America	64
Engineering & Research	90
Essex Rotary File & Tool Co.	261
Ex-Cell-O Corp.	146

F

Fairfield Gauge Co., Inc.	218
Famco Machine Co.	20
Farrell-Birmingham Co., Inc.	5
Federal Press Co.	200
Federal Tool & Mfg. Co.	253
Foote-Burt Co.	92
Fosdick Machine Tool Co.	36, 37
Fostoria Pressed Steel Corp.	260
Fulmer Co., C. Allen	6

G

Gallmeyer & Livingston Co.	101
Gammans-Hoaglund Co.	271
General Mfg. Co.	217
Gillen Co., John	258

Gisholt Machine Co.	7, 23
Gorton Machine Co., Geo.	72
Gavra-Nelson Co.	83
Grant Mfg. & Machine Co.	221
Greaves Machine Tool Co.	163
Greenlee Bros. & Co.	187
Greenlee Tool Co.	210
Groov-Pin Corp.	248
Gwilliam Co.	227

H

Hamilton Tool Co.	171, 173, 175
Hanchett Magna-Lock Corp.	67
Hancock Mfg. Co.	228
Hartmann Mfg. Co.	245
Heimann Mfg. Co.	239
Heller Bros. Co.	141
Heller Machine Co.	22
Hersen Chemical Co.	246
High Speed Hammer Co.	207
Himoff Machine Co., Inc.	230
Hisey-Wolf Machine Co.	292
Hjorth Lathe & Tool Co.	267
Hoggson & Pettis Mfg. Co.	211
Holo-Krome Screw Corp.	Fourth Cover
Houston Grinding & Mfg. Co., Inc.	53
Howe & Fant, Inc.	69

I

Ideal Industries, Inc.	65
------------------------	----

J

J & S Tool Co., Inc.	11
Johansson Gage Co., C. E.	86
Johnson & Bassett, Inc.	95
Jones & Lamson Machine Co.	38

K

Kasenit Co.	264
Kaufman Mfg. Co.	207
Keo Cutters	207



FOR LESS THAN \$40 YOU GET 12 SETS, EACH SET GROUND READY TO GO

Men would not accept either idea at first **INSERT CHASERS SAVE UP TO 33%**

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$40 you get a dozen sets of $\frac{3}{4}$ —16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

free: "Selecting the Proper Die Head for the Job"

THE EASTERN MACHINE SCREW CORPORATION

40-50 BARCLAY ST.

NEW HAVEN, CONN.

For more data circle 549 on Reader Service Card

August, 1955

modern machine shop 287

index to advertisements • (For listings of products consult Where To Get It Section)

Kidde Precision Tool Corp.	208, 233
King, Andrew	216
Klaas Machine & Mfg. Co.	186

L

L-W Chuck Co.	96
Laminated Shim Co., Inc.	188
Landis Machine Co.	2
Lapeer Mfg. Co.	63
Latrobe Steel Co.	62
LeBlond Machine Tool Co., R. K.	12, 13
Lees-Bradner Co.	80
Leiman Bros., Inc.	217
Lewthwaite Machine Co., T. H.	236
Linley Bros. Co.	266
Lodge & Shipley Co.	4, 26, 27
Logansport Machine Co., Inc.	97
Lucas & Son, Inc., J. L.	245

M

Madison-Kipp Corp.	241
Manhattan Supply Co.	251
Martin Machine Co., J. E.	239
Metal Carbides Corp.	226
Metallizing Engr. Co., Inc.	185
Mettler Machine Tool, Inc.	229
Michigan Chrome & Chemical Co.	230
Micro Drill Guide	230
Miller Fluid Power Co.	178, 179
Morris Machine Tool Co.	16, 17
Mummert-Dixon Co.	239

N

National Acme Co.	148, 149
National Automatic Tool Co., Inc.	143
National Broach & Machine Co.	151
National Machine Tool Builders Assoc.	277
Nebel Machine Tool Corp.	74, 75, 94
Neise, Karl A.	251, 268
Nelco Tool Co., Inc.	184
New Albany Machine Mfg. Co.	198
New Method Steel Stamps, Inc.	237
Nichols-Morris Corp.	235
Nielsen, Inc.	213

Nielsen Tool & Die Co.	224
Nilson Machine Co., A. H.	68
Noble & Westbrook Mfg. Co.	177
Nobur Mfg. Co.	211
Norma-Hoffman Bearings Corp.	30
Norton Co.	33, 50, 51, 91, 262
Numberall Stamp & Tool Co.	209
Nu-Tangs, Inc.	233

O

OK Tool Co.	55
Oliver Instrument Co.	42
Olson Industrial Products Co.	231
O'Neil-Irwin Mfg. Co.	137
Ottomiller Co., Wm. H.	213

P

Peaslee Metal Products Co.	208
Pedrick Tool & Machine Co.	98
Perkin-Elmer Corp.	225
Pines Engr. Co., Inc.	204
Precise Products Corp.	244
Precision Detroit Co.	249
Procurier Safety Chuck Co.	265
Putnam Tool Co.	47
Pyrometer Instrument Co.	176

Q

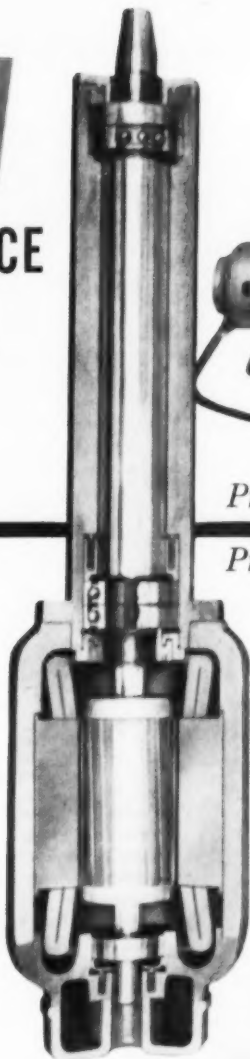
Queen City Machine Tool Co.	242
-----------------------------	-----

R

Raymac Mfg. Co.	233
Raymond Corp.	212
Reading Machine Co.	236
Reid Tool Supply Co.	209
Richards Co., J. A.	218
Roberts Rubber Co., Weldon	279
Robbins Co., Omer E.	73

NEW

TAFT-PEIRCE GRINDING SPINDLE



*Provides Ultimate in
Precision and Finish*

Here's a new model Grinding Spindle that permits the very finest micro-inch finishes. Ideal for surface grinders and many other machine tools, this new T-P Grinding Spindle offers a long list of quality features.

Precision balanced on its one bearing

Low operating temperature

Rugged internal construction eliminates deflection and vibration

Springs assure constant uniform preload — no maintenance required

Labyrinth sealing system eliminates drag or wear

Spindle shaft is hardened and completely finish-ground for alignment and balance

Simple holding means for mounting wheel thimbles

Built with the utmost care and precision for our own use, this spindle is now available as a standard product. Write for details.

See them at the show — Booth B11



SPECIFICATIONS

Motor — 1 h.p.

Speed — 3600 r.p.m.

Quill — 3" diameter

Nose Taper — 3" per foot

Length — 23 1/2" overall

Lifetime lubrication



Battery Surface Grinders



Precision Surface Grinders



Lapping Machines



Bath Spot Facing Machines



THE TAFT-PEIRCE MANUFACTURING COMPANY • WOONSOCKET, RHODE ISLAND

For more data circle 550 on Reader Service Card

August, 1955

modern machine shop 289

index to advertisements • (For listings of products consult Where To Get It Section)

Rockford Machine Tool Co.	89
Rockwin Mfg. Co.	241
Rodgers Hydraulic, Inc.	99
Rotor Tool Co.	135
Rowbottom Machine Co.	237
Royal Oak Tool & Machine Co. ...	Third Cover
Rusnok Tool Wks.	195
Ruthman Mchry. Co.	285

S

Savage Co., W. J.	225
Scherr Co., Inc., Geo.	209, 233
Schmarje Tool & Engr. Co.	235
Schmidt, Inc., Geo. T.	88
Scott Paper Co.	18, 19
Seneca Falls Machine Co.	21
Shaker Tool & Die Co.	269
Sheldon Machine Co., Inc.	167
Shell Oil Co., Inc.	44, 45
Skinner Chuck Co.	247
South Bend Lathe Wks.	153
Sperman Metal Specialties	216
Springfield Machine Tool Co.	156, 157
Standard Automotive Parts, Inc.	243
Standard Electrical Tool Co.	222
Standard Gage Co.	152
Standard Horse Nail Corp.	231
Standard Oil Co. (Indiana)	59
Standard Pressed Steel Co.	192
Standard Steel Specialty Co.	215
Staples Tool Co.	201
Stearns Magnetic, Inc.	202
Sterling Factory Equipment Co.	227
Stevens, Inc., John B.	205
Sturtevant Co., P. A.	211
Sun Oil Co.	133
Sundstrand Machine Tool Co.	232

T

Taft-Peirce Mfg. Co.	14, 15, 289
Taylor Dynamometer & Machine Co.	180
Texas Co.	Second Cover
Thompson Mfg. Co., Inc.	208
Thriftmaster Products Corp.	203

Torit Mfg. Co.	238
Torrington Co.	31
Troyke Mfg. Co.	169
Twentieth Century Mfg. Co.	166

U

U. S. Automatic Box Mchry. Co., Inc.	223
U. S. Drill Head Co.	214
U. S. Rubber Co.	193
Universal Engr. Co.	220
Up-To-Date Tool Co.	221

V

Vaill Engr. Co.	219
Van Keuren Co.	56
Verson Allsteel Press Co., Inc. ...	First Cover, 34
Victomatic Co.	168
Vimco Mfg. Co.	243

W

Waldes Kohinoor, Inc.	29
Walker Co., Inc., O. S.	254
Walls Sales Corp.	235
Waltham Machine Wks., Inc.	190
Wardwell Mfg. Co.	240
Watts Bros. Tool Wks.	224
Weldon Tool Co.	250
Wells & Sons, W. F.	257
Westfield Gage Co.	269
Whitney Metal Tool Co.	225
Wilson Mechanical Instrument Div.	43
Wirth & Son, Inc., Carl	239
Wisconsin Drill Head Co.	58
Wohlrip Products, Inc.	237

Z

Zeh & Hahneemann Co.	190
---------------------------	-----



JOSEPH P. SPANG, JR.

Portrait by Fabian Bachrach

**"A majority of
the employees
at Gillette . . ."**

"The United States Savings Bonds program is good for the personal security of the bond buyer—good for the security and economy of the Country. A majority of the employees at Gillette Safety Razor Company purchase Savings Bonds the payroll savings way. Under this plan they find it easy to save a tidy sum for retire-

ment years, to pay that unexpected bill, or meet the expense of other emergencies that arise."

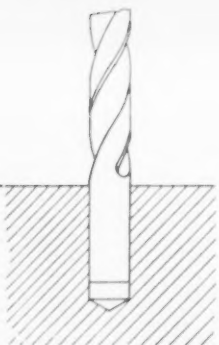
JOSEPH P. SPANG, JR., *President*
The Gillette Company

If you have less than 50% employee participation in your Payroll Savings Plan . . . if you have not conducted a person-to-person canvass in the past two years . . . or if you do not have The Plan, get in touch with Savings Bond Division, U.S. Treasury Department, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

MODERN MACHINE SHOP





MAKE THIS TEST TODAY!

Drill a hole with a twist drill which has been sharpened in your regular manner—THEN try the shank in a hole just drilled. If the fit is snug, your present method of grinding is satisfactory if it isn't taking too much time. But if the fit is sloppy, now is the time to check further. A "HISEY" Drill Grinder can very well be the answer.



"HISEY" Drill Grinders are made in 3 sizes and several types for sharpening drills from No. 60 to 2½" diameter. They will grind straight or taper shank drills with 2, 3 or 4 flutes; also chucking drills and flat or flat twisted drills with oversize shanks. Adjustments are provided for varying the point angle and clearance angle. Machines are made in wet and dry types.

Write for Catalog 72MV

Grinders & Buffers

Hisey THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

Since 1896

For more data circle 551 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

(PLEASE PRINT PLAINLY)

August 1955 Issue

GOOD UNTIL OCTOBER 1, 1955

Your Name _____

Your Title _____

Company Name _____

Company Address _____

City _____

Zone _____ State _____

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

431 Main Street
Cincinnati 2, Ohio

**modern
machine
shop**

EDITORIAL ITEMS

1	21	41	61	81	101	121	141
2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	158
19	39	59	79	99	119	139	159
20	40	60	80	100	120	140	160

ADVERTISEMENTS

	First Cover	Second Cover	Third Cover	Fourth Cover
201	220	239	258	277
202	221	240	259	278
203	222	241	260	279
204	223	242	261	280
205	224	243	262	281
206	225	244	263	282
207	226	245	264	283
208	227	246	265	284
209	228	247	266	285
210	229	248	267	286
211	230	249	268	287
212	231	250	269	288
213	232	251	270	289
214	233	252	271	290
215	234	253	272	291
216	235	254	273	292
217	236	255	274	293
218	237	256	275	294
219	238	257	276	295
220	239	258	277	296
221	240	259	278	297
222	241	260	279	298
223	242	261	280	299
224	243	262	281	300
225	244	263	282	301
226	245	264	283	302
227	246	265	284	303
228	247	266	285	304
229	248	267	286	305
230	249	268	287	306
231	250	269	288	307
232	251	270	289	308
233	252	271	290	309
234	253	272	291	310
235	254	273	292	311
236	255	274	293	312
237	256	275	294	313
238	257	276	295	314
239	258	277	296	315
240	259	278	297	316
241	260	279	298	317
242	261	280	299	318
243	262	281	300	319
244	263	282	301	320
245	264	283	302	321
246	265	284	303	322
247	266	285	304	323
248	267	286	305	324
249	268	287	306	325
250	269	288	307	326
251	270	289	308	327
252	271	290	309	328
253	272	291	310	329
254	273	292	311	330
255	274	293	312	331
256	275	294	313	332
257	276	295	314	333
258	277	296	315	334
259	278	297	316	335
260	279	298	317	336
261	280	299	318	337
262	281	300	319	338
263	282	301	320	339
264	283	302	321	340
265	284	303	322	341
266	285	304	323	342
267	286	305	324	343
268	287	306	325	344
269	288	307	326	345
270	289	308	327	346
271	290	309	328	347
272	291	310	329	348
273	292	311	330	349
274	293	312	331	350
275	294	313	332	351
276	295	314	333	352
277	296	315	334	353
278	297	316	335	354
279	298	317	336	355
280	299	318	337	356
281	300	319	338	357
282	301	320	339	358
283	302	321	340	359
284	303	322	341	360
285	304	323	342	361
286	305	324	343	362
287	306	325	344	363
288	307	326	345	364
289	308	327	346	365
290	309	328	347	366
291	310	329	348	367
292	311	330	349	368
293	312	331	350	369
294	313	332	351	370
295	314	333	352	371
296	315	334	353	372
297	316	335	354	373
298	317	336	355	374
299	318	337	356	375
300	319	338	357	376
301	320	339	358	377
302	321	340	359	378
303	322	341	360	379
304	323	342	361	380
305	324	343	362	381
306	325	344	363	382
307	326	345	364	383
308	327	346	365	384
309	328	347	366	385
310	329	348	367	386
311	330	349	368	387
312	331	350	369	388
313	332	351	370	389
314	333	352	371	390
315	334	353	372	391
316	335	354	373	392
317	336	355	374	393
318	337	356	375	394
319	338	357	376	395
320	339	358	377	396
321	340	359	378	397
322	341	360	379	398
323	342	361	380	399
324	343	362	381	400
325	344	363	382	401
326	345	364	383	402
327	346	365	384	403
328	347	366	385	404
329	348	367	386	405
330	349	368	387	406
331	350	369	388	407
332	351	370	389	408
333	352	371	390	409
334	353	372	391	410
335	354	373	392	411
336	355	374	393	412
337	356	375	394	413
338	357	376	395	414
339	358	377	396	415
340	359	378	397	416
341	360	379	398	417
342	361	380	399	418
343	362	381	400	419
344	363	382	401	420
345	364	383	402	421
346	365	384	403	422
347	366	385	404	423
348	367	386	405	424
349	368	387	406	425
350	369	388	407	426
351	370	389	408	427
352	371	390	409	428
353	372	391	410	429
354	373	392	411	430
355	374	393	412	431
356	375	394	413	432
357	376	395	414	433
358	377	396	415	434
359	378	397	416	435
360	379	398	417	436
361	380	399	418	437
362	381	400	419	438
363	382	401	420	439
364	383	402	421	440
365	384	403	422	441
366	385	404	423	442
367	386	405	424	443
368	387	406	425	444
369	388	407	426	445
370	389	408	427	446
371	390	409	428	447
372	391	410	429	448
373	392	411	430	449
374	393	412	431	450
375	394	413	432	451
376	395	414	433	452
377	396	415	434	453
378	397	416	435	454
379	398	417	436	455
380	399	418	437	456
381	400	419	438	457
382	401	420	439	458
383	402	421	440	459
384	403	422	441	460
385	404	423	442	461
386	405	424	443	462
387	406	425	444	463
388	407	426	445	464
389	408	427	446	465
390	409	428	447	466
391	410	429	448	467
392	411	430	449	468
393	412	431	450	469
394	413	432	451	470
395	414	433	452	471
396	415	434	453	472
397	416	435	454	473
398	417	436	455	474
399	418	437	456	475
400	419	438	457	476
401	420	439	458	477
402	421	440	459	478
403	422	441	460	479
404	423	442	461	480
405	424	443	462	481
406	425	444	463	482
407	426	445	464	483
408	427	446	465	484
409	428	447	466	485
410	429	448	467	486
411	430	449	468	487
412	431	450	469	488
413	432	451	470	489
414	433	452	471	490
415	434	453	472	491
416	435	454	473	492
417	436	455	474	493
418	437	456	475	494
419	438	457	476	495
420	439	458	477	496
421	440	459	478	497
422	441	460	479	498
423	442	461	480	499
424	443	462	481	500
425	444	463	482	501
426	445	464	483	502
427	446	465	484	503
428	447	466	485	504
429	448	467	486	505
430	449	468	487	506
431	450	469	488	507
432	451	470	489	508
433	452	471	490	509
434	453	472	491	510
435	454	473	492	511
436	455	474	493	512
437	456	475	494	513
438	457	476	495	514
439	458	477	496	515
440	459	478	497	516
441	460	479	498	517
442	461	480	499	518
443	462	481	500	519
444	463	482	501	520
445	464	483	502	521
446	465	484	503	522
447	466	485	504	523
448	467	486	505	524
449	468	487	506	525
450	469	488	507	526
451	470	489	508	527
452	471	490	509	528
453	472	491	510	529
454	473	492	511	530
455	474	493	512	531
456	475	494	513	532
457	476	495	514	533
458	477	496	515	534
459	478	497	516	535
460	479	498	517	536
461	480	499	518	537
462	481	500	519	538
463	482	501	520	539
464	483	502	521	540
465	484	503	522	541
466	485	504	523	542
467	486	505	524	543
468	487	506	525	544
469	488	507	526	545
470	489	508	527	546
471	490	509	528	547
472	491	510	529	548
473	492	511	530	549
474	493	512	531	550
475	494	513	532	551
476	495	514	533	552
477	496	515	534	553
478	497	516	535	554
479	498	517	536	555
480	499	518	537	556
481	500	519		

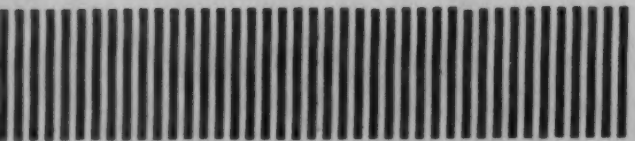
FIRST CLASS
PERMIT No. 7414
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

4C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**BOX 74
VILLAGE STATION
NEW YORK 14, NEW YORK**



"RO" Form Relief

You get more cuts per sharpening from your tools if you leave metal to support the edge



- A** Sharpens these cutting edges with any degree of form relief.
- B** No undercutting at intersection — no burr on work piece.
- C** Diameters can be cylindrically ground or relieved as desired.

There is a constant increase in the number of shops bringing their tool grinding practices up to date by standardizing on form relief sharpening as a means of reducing tool costs. No other fixture offers the ease of set-up and operation and the flexibility of the "RO" Universal Form Relieving Fixture.

GRINDER DIVISION
ROYAL OAK TOOL & MACHINE CO.

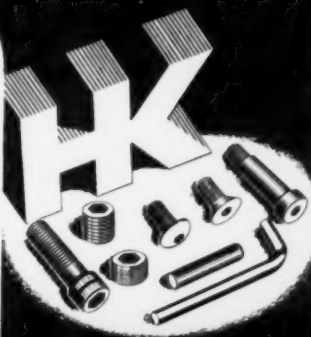
29800 STEPHENSON HY.
ROYAL OAK, MICH.

WRITE FOR
CATALOG

CALL YOUR HOLO-KROME DISTRIBUTOR FOR

SAME DAY SERVICE

ON AMERICA'S TOP-QUALITY SOCKET SCREWS



Any Holo-Krome distributor in the nation can give you a brand of service never before enjoyed by users of socket screw products . . .

Because Holo-Krome ships all standard catalog items right from stock the same day the order is received!

What about Specials? We're proud to say that even the "impossible" ones are leaving the H-K plant in 4 weeks or better — mostly better!

Every day, more and more people specify Holo-Krome — because the price is right, the delivery's right and the quality's always Best!

We guarantee it! Next time, just say . . . HOLO-KROME!

HOLO-KROME
Completely Cold Forged
SOCKET SCREWS

THE HOLO-KROME SCREW CORP. • HARTFORD 10, CONN., U. S. A.